

User's Manual

Sices Supervisor

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1. Introduction

SicesSupervisor is an application developed on PCs in a Windows environment for the supervision of generator sets controlled by boards manufactured by SICES s.r.l. This application has been designed to provide customers with an user-friendly supervision system, which allows them to monitor plant parameters and measurements.

It can manage all the plants using SICES boards: These are single generator sets or multiple parallel sets, emergency plants, power supply plants or plants operating in parallel to the electric mains.

This application can be configured. Thanks to it, the user can create and manage simultaneously as many configurations as the plants to be controlled. Each plant configuration is totally independent and can be configured to mirror the reference system. Board measurements and parameters are acquired and stored with procedures that can be programmed by the user (the default configurations are already excellent). These data can be stored in standard formats to allow the user to file and process them easily even outside the application. These data can be examined within the application using its instruments even offline (it is possible to connect to the plant, download data, close the connection, and then process the downloaded data).

This application can be configured automatically. It is able to recognize automatically the connected board type and adapts to it. It displays and makes available for changes only those parameters and measurements allowed by the board (and by the specific software version of the board). It automatically notifies the operator if it detects discrepancies between the manually configured data and those transferred by the serial communication. This allows easy updating of the supervision following board changes in the plant.

This application is safe. It has four access levels protected by password. The protection of some functions is compulsory, while other functions can be configured for single plants. This allows, for example, plant supervision by anyone, but control or parameter modification only by users with password.

This application is multi-language. It comes in English and Italian. Users can add as many languages as they wish (by changing some simple databases to Access 2000 format). The language can be selected at the start of the program.

Any of the communication devices on the PC can be used to communicate with the boards: RS-232 ports, Ethernet network, analogue modems, ISDN, GSM, etc. This is possible thanks to the fact that SicesSupervisor uses the operating system supports to manage communication.

2. Using SicesSupervisor

2.1 Starting the Application

To start the SUPERVISOR from the Start menu in Windows, select:

“Start” → “Programs” → “Sices” → “SicesSupervisor” → “SicesSupervisor”.

2.2 Application Windows

The supervision application basically consists of two separate but communicating windows: The COMMUNICATION SERVER, for data transfer with the plants, and the SUPERVISOR (SicesSupervisor). Both windows are automatically opened when starting the application. Here is a description of the 2 windows:

- **COMMUNICATION SERVER:** It operates on the background and manages all the communication devices of the machine where it has been installed. It manages communication with the plant boards via the suitable communication protocol. The window displays useful information to diagnose possible operation problems.
- **SICESUPERVISOR:** It manages data display. Generally, the operator only interacts with the SUPERVISOR. The SUPERVISOR interacts with the COMMUNICATION SERVER to get the required data, but it never directly uses the communication devices.

See also “10 - Networking”.

2.3 Ending the Application

To end the application, close one of the two windows. The other one will automatically close. See also “10 - Networking”.

2.4 Selecting a language

SicesSupervisor is a multi-language program. Italian and English are the default languages. The final user can add and use different languages. The language must be selected at the start of the application. When loading, the waiting window displayed has a series of buttons for the different languages in its lower part. The button for the current language will be selected. Click another button to select another language. The selected language will be stored in a set up file, and will be used from then on.

2.4.1 Adding a Language

To add a language to the program, follow these steps:

- Create 32 x 32 pixel icon. Save it in the “Images\Flags” subfolder in the main SicesSupervisor folder. Name it according to the original language (i.e. Deutsch.ico, not German.ico).
- Some “.MDB” files (Access 2000 format database) are saved in the main program folder. Each database has a table named “TLanguages”. Some databases have other tables: **do not modify them.**
- Each “TLanguages” table has two fixed columns plus one for each language:
 - “Comment”: This column contains a description of the use of the relevant string by the program. The program does not use it, but do not modify the content of this column.
 - “ID”: It contains a single identifier for each string. **Never modify this column** since the application has access to the strings via the values in this column.
 - “Italiano”, “English”, etc.: They contain strings used by the application for each language.

- To add a new language, open the table to change its structure, then add a "Memo" type column. This column will have to be named exactly like the icon file, without the ".ico" extension. Then, open the same table to modify its data, and fill the new column with the translation of the strings corresponding to the existing languages.
- Use the apostrophe only if absolutely necessary (it may cause problems if the string needs to be stored in the database log files). In addition, the "&" symbol is used in the notification messages. This symbol associates a macro to the most used commands, which will be activated by pressing ALT and the letter connected to the symbol. Where possible, it would be useful to associate the same macro to a control for all the languages (the position of the symbol in the string is not relevant).

3. SicesSupervisorConfiguration

The configuration of SicesSupervisor entails some selections and setting parameters for the application to know where to read/write plant configurations, data, and roadmaps, how to access, communicate with, and protect them by undesired access.

From SicesSupervisor version 2.00, the most common configuration operations have been developed as step-by-step procedures, requesting information to the operator at each step, and providing exhaustive explanations to help them in case of doubts, so that they do not need to refer to the manual.

Configuration operations are described below and will be detailed throughout the section, with appropriate notes on when and how to perform them:

- License key (See section "3.6 Setting the License Key")
- Data organization (and sharing) (See section 3.3)
- Plant configuration (See section 3.1)
- Communication device configuration (See section 3.4)
- Administration password configuration (See section 3.5)

This list follows the correct operation sequence after the first set up. The following sections follow a different order, so that operations are described without readers needing to skip forward or backward through the sections.

After its set up, SicesSupervisor can automatically start the above-listed operations, in the order given below:

1. Request of license key (if this operation is cancelled, the program ends).
2. Selection of data networking and configuration options (only if networking mode is enabled by the license key).
3. Creation of a plant (only if plants are connected when launching the program).
4. Selection of a communication device (only if no devices are selected when launching the program).

Some of these procedures can be started the following time the application is started, if SicesSupervisor requires it.

3.1 Plant Configuration

SicesSupervisor uses three types of resources for configuring plants: These are called "board", "plant", and "container".

The "board" resource mirrors, inside SicesSupervisor, the real SICES boards (DST4600A, EM1100, DST4601, etc.). Through this resource, SicesSupervisor can be informed in detail about the board type, its options, and ways to acquire its data.

The "plant" resource mirrors the whole of the plant and therefore consists of one or more boards. In SicesSupervisor, a plant is a group of boards with which is possible to communicate simultaneously via one communication device alone. For example, a valid plant consists of more boards connected to each other by an RS-485 line, which is in turn connected to the PC. A non-valid plant consists of more boards each with its modem (since SicesSupervisor will only be able to communicate with them one at a time, and will have to dial different phone numbers to communicate with the others). This second type of plant is detected by SicesSupervisor as a series of different plants. In addition to boards, the "plant" resource allows configurations that do not depend on them (i.e., telephone number and communication protocol). When managing plants with more groups, some information (like electric mains voltage measurements) cannot be automatically linked to one board only. The "plant" resource makes it possible to identify the board which should provide this kind of information.

Finally, the "container" resource does not mirror anything, but it only allows a hierarchical organization of the plants. It should be used by operators wishing to monitor several plants: This resource allows organising plants according to their type, geographical location, or any other criteria. This allows a better organisation of the plants, and, as it will be described in section "10 - Networking", it also allows assigning each plant to a PC, in situations where data are shared among more PCs.

Plants can be configured according to three step-by-step procedures, one for each resource described above.

3.1.1 Container Configuration

To manage containers, an administration password is needed (the default one is "ADMIN"). A container cannot be deleted, for example, if it contains plants whose password is not known by the operator. All the operations listed below require the above-mentioned password.

3.1.1.1 Adding a Container

A container can only be contained in another container. There is always a "parent" container ("\$\$") for the entire hierarchy. It is therefore essential to set a "parent" container before being able to add a new container:

- Click on the "parent" container in the resource hierarchy, then, click on the arrow at the right of the "Add" button on the toolbar, and finally on "Container".
- Click on the "parent" container in the resource hierarchy, then on the menu "Plants -> Add -> Container".
- Right click on the "parent" container in the resource hierarchy, then select "Add -> Container" from the context menu.

When creating a new container, SicesSupervisor names it with a unique number. It is advisable to change it immediately with a more recognizable name. To perform this operation, follow the step-by-step procedure described in 3.1.1.7.

3.1.1.2 Modifying the Properties of a Container

To perform this operation:

- Click on the relevant container in the resource hierarchy, then on the "Property" button in the toolbar.
- Click on the relevant container in the resource hierarchy, then follow the "Plants -> Properties" path.
- Click on the relevant container in the resource hierarchy, then click F4.
- Right click on the relevant container in the resource hierarchy, then select "Properties" from the context menu.

To perform this operation, follow the step-by-step procedure described in 3.1.1.7.

3.1.1.3 Renaming a Container

To perform this operation:

- Follow the modification procedure described in the previous section.
- Click on the relevant container in the resource hierarchy, then click F2. This allows changing the name of the container directly from the folder display. See notes on the plant name in section 3.1.1.7.

3.1.1.4 Deleting a Container

To perform this operation:

- Click on the relevant container in the resource hierarchy, then on the "Remove" button in the toolbar.
- Click on the relevant container in the resource hierarchy, then follow the "Plants -> Remove" path.
- Click on the relevant container in the resource hierarchy, then click "Canc" or "Delete".
- Right click on the relevant container in the resource hierarchy, then select "Remove" from the context menu.

Warning: Deleting a container also deletes all the resources contained in it (containers, plants, and boards). SicesSupervisor asks for confirmation before proceeding.

3.1.1.5 Duplicating a Container

To perform this operation, first select a "source" container to be duplicated. Then:

- Click on the "source" container in the resource hierarchy, then on the "Duplicate" button in the toolbar.
- Click on the "source" container in the resource hierarchy, then follow the "Plants -> Duplicate" path.
- Right click on the "source" container in the resource hierarchy, then select "Duplicate" from the context menu.

SicesSupervisor then displays a window where to select the "parent" container for the new resource (that is where the container will have to be copied). Duplicating a container also copies all the resources contained in it. The copied containers and boards will keep their original names, while the plants will be renamed by adding a "_" sign in front. This is justified by the fact that the names of the plants must be unique, even if located in different containers,

for reasons that will be explained further on. To perform this operation, follow the step-by-step procedure described in 3.1.1.7.

3.1.1.6 Moving a Container

To perform this operation:

- Click on the relevant container in the resource hierarchy, then follow the "Plants -> Move" path.
- Right click on the relevant container in the resource hierarchy, then select "Move" from the context menu.

SicesSupervisor then displays a window where to select the "parent" container where to move the selected container. Moving a container entails moving all the resources contained in it. The containers, plants, and boards moved will keep their names. If there is a container in the destination container with the same name of the selected one to be moved, the operation will not be completed.

3.1.1.7 Step-by-Step Procedure to Modifying a Container

This procedure consists of one step only, which requires:

- A name for the container. This should be a unique name in the "parent" resource. Only "child" containers can share the same name provided that they are located in two different containers. In addition, it is important to notice that this name will be used for naming a folder on the hard disk. It is essential to use only characters that can be used for naming folders in Windows operating systems (for example, ? / and \ are not valid characters). If an already existing or invalid name are used, an error message will be displayed. The same will happen if the folder was not successfully created or renamed (for example, if "Explorer" is open for the selected folder).
- A description. This is not used by SicesSupervisor, and can be skipped. It is available only to allow for a more exhaustive content description than just the name.

3.1.2 Plant Configuration

One of the properties of the "plant" resource is the control password. If set, this password is required for all the operations listed below (except for creating a new plant, which requires a void control password).

3.1.2.1 Adding a Plant

A plant can only be a "child" of a container. It is therefore essential to set a "parent" container before being able to add a new plant:

- Click on the "parent" container in the resource hierarchy, then, click on the arrow at the right of the "Add" button on the toolbar, and finally on "Plant".
- Click on the "parent" container in the resource hierarchy, then on the menu "Plants -> Add -> Plant".
- Right click on the "parent" container in the resource hierarchy, then select "Add -> Plant" from the context menu.

When creating a new plant, SicesSupervisor names it with a unique number. It is advisable to change it immediately with a more recognizable name. To perform this operation, follow the step-by-step procedure described in 3.1.2.7.1

3.1.2.2 Modifying the Properties of a Plant

To perform this operation:

- Click on the relevant plant in the resource hierarchy, then on the "Property" button in the toolbar.
- Click on the relevant plant in the resource hierarchy, then follow the "Plants -> Properties" path.
- Click on the relevant plant in the resource hierarchy, then click F4.
- Right click on the relevant plant in the resource hierarchy, then select "Properties" from the context menu.

To perform this operation, follow the step-by-step procedure described in 3.1.2.7.1

3.1.2.3 Renaming a Plant

To perform this operation:

- Follow the modification procedure described in the previous section.
- Click on the relevant plant in the resource hierarchy, then click F2. This allows changing the name of the plant directly from the folder display. See notes on the plant name in section 3.1.2.7.1

3.1.2.4 Deleting a Plant

To perform this operation:

- Click on the relevant plant in the resource hierarchy, then on the "Remove" button in the toolbar.
- Click on the relevant plant in the resource hierarchy, then follow the "Plants -> Remove" path.
- Click on the relevant plant in the resource hierarchy, then click "Canc" or "Delete".
- Right click on the relevant plant in the resource hierarchy, then select "Remove" from the context menu.

Warning: Deleting a plant also deletes all the boards contained in it. SicesSupervisor asks for confirmation before proceeding.

3.1.2.5 Duplicating a Plant

To perform this operation, first select a "source" plant to be duplicated. Then:

- Click on the "source" plant in the resource hierarchy, then on the "Duplicate" button in the toolbar.
- Click on the "source" plant in the resource hierarchy, then follow the "Plants -> Duplicate" path.

- Right click on the "source" plant in the resource hierarchy, then select "Duplicate" from the context menu.

SicesSupervisor then displays a window where to select the "parent" container for the new plant (that is where the plant will have to be copied). Duplicating a plant also copies all the boards contained in it. The copied boards will keep their names, while the plant will be renamed with a unique number. This name can be changed immediately with the procedure described in 3.1.2.7.5

3.1.2.6 Moving a Plant

To perform this operation:

- Click on the relevant plant in the resource hierarchy, then follow the "Plants -> Move" path.
- Right click on the relevant plant in the resource hierarchy, then select "Move" from the context menu.

SicesSupervisor then displays a window where to select the "parent" container where to move the selected plant. Moving a plant entails moving all the resources contained in it. The plant and boards moved will keep their names. If there is a plant in the destination container with the same name of the selected one to be moved, the operation will not be successful.

3.1.2.7 Step-by-Step Procedure to Modifying a Plant

This procedure consists of six steps

3.1.2.7.1 Step 1

This step is for setting:

- A name for the plant. This must be a unique name. There cannot be two plants with the same name, even if in different containers. This allows easy and quick identification of plants when there are calls from them. In addition, it is important to notice that this name will be used for naming a folder on the hard disk. It is essential to use only characters that can be used for naming folders in Windows operating systems (for example, ? / and \ are not valid characters). If an already existing or invalid name are used, an error message will be displayed. The same will happen if the folder was not successfully created or renamed (for example, if "Explorer" is open for the selected folder). As it will be explained later in the text, a shared management of the configuration allows assigning a PC the management of only one part of the plants. In this step, when adding or renaming a plant on the said PC, it is not possible to have an overview of the plants, and it is therefore not possible to know beforehand if an existing name is being used. This issue cannot be avoided. However, when sharing a configuration, there should be an administrator having an overview of the plants. This administrator should be the only one in charge of creating new plants.
- A description. This is not used by SicesSupervisor, and can be skipped. It is available only to allow for a more exhaustive resource description than just the name.

3.1.2.7.2 Step 2

This step is for configuring the communication options to be used for the plant.

- Communication protocol. SicesSupervisor supports two communication protocols: "ModBus Rtu" and "DST4600". The first one is a standard industrial protocol and is widely used. The other protocol ("DST4600") is implemented only to use SicesSupervisor with the DST4600 boards supporting it.

The "ModBus RTU" protocol can be used with the following boards: DST4600A, DST4601, DST4400, EM1100, ModBus/TCP Gateway, and Telesegnali. The "DST4600" protocol can be used with the following boards: DSAT4600, and DST4600A. The only board supporting both protocols is the DST4600A. It implements them for compatibility with the DST4600 (since it represents its newest version). The protocol is chosen by parameter P.51 of this board (see relevant operation manual). It is recommended to set ModBus as protocol for DST4600A boards, since it supports transfer of more information (for example, the DST4600 protocol cannot acquire data on the power measurements on the single phases).

It is advisable to set the "DST4600" protocol if the plant has a DST4600 board. For all the other boards, use the ModBus protocol. Since it is a plant configuration, it applies to all the connected boards. This entails that if there is a DST4600 board in a plant, the same plant cannot have any other board than DST4600 and DST4600A.

- Communication timeout. Both protocols described above are of a "Master/Slave" type, which means there is a Master (the PC) polling and one or more slaves (the boards) answering. Therefore, the PC sends messages to the boards and waits for their answer. If the board is off, damaged, or if it does not receive the request, it will never answer and the PC will be in stand-by indefinitely. The timeout is the maximum time limit between polling and receiving an answer. After this time has elapsed without receiving an answer, the PC marks the message as an error and moves onto the next ones. Since it is a maximum time limit, performance will not be affected if it is increased (performance will be negatively affected only if boards do not answer). With some communication devices (for example, GSM modems), the delay between polling and answer can vary substantially depending on external factors (GSM network busy). In these cases, it is suggested to increase this parameter to five seconds (set 5000) or higher.
- Delay between two messages. Normally, after receiving an answer by a board, the PC immediately sends its next poll via the communication device. Sometimes this may cause some problems (usually with GSM modems, but sometimes also with the RS-232/RS-485 converters). In these cases, a delay can be set by using this parameter. Attention: This is a fixed delay on any message sent and therefore this entails worse performance. Only use this parameter when necessary. It should be set starting from zero and increasing it by small fractions (50 ms) at a time until good performance results are achieved.

3.1.2.7.3 Step 3

This step is for configuring the telephone number to be used for the plant. This step can be skipped if using a direct serial port or an Ethernet network as communication device. The telephone number is set at plant level. This means that for each effective plant, there can only be one modem. Since boards directly manage modems, the only plants to connect to via modem are those consisting of one generator set only. A separate board to act as "concentrator" is being designed, although it is not yet available. It should be equipped with a modem and a further serial port, which can be connected to the other boards on the plant.

The telephone number can be set in two ways: The so-called "canonical format", which requires the subdivision of the number in international code, national code, and number, or by dialling it directly. With the canonical format, SicesSupervisor will use the "dialling options" set in Windows Control Panel (these options allows setting operator assisted dialling, among others). Otherwise, the number will be dialled exactly as set: This allows adding characters with special meaning, as a comma for a pause during dialling operations. Refer to the modem manual for the description of the above-mentioned special characters.

If using the canonical format, set the international code without the double zero and without the "+" sign, and the national code without the zero.

If there is a GSM modem on the plant, this step will also comprise setting the SIM card **data** number. Some telephone operators have a single number for phone calls, data and fax, while some others have separate numbers. Some operators automatically enable data on their SIM cards, while others require a special request. Finally, some operators automatically enable

data on their SIM cards on received calls, but not on dialled numbers. Check SIM options on the contract or directly with the customer service.

3.1.2.7.4 Step 4

This step is for configuring the protection passwords for the plant. They are obviously valid only for this plant and for its boards. There are two passwords:

- Control password. This password is needed to access the plant and boards configuration and enables sending control inputs or writing parameters on the boards.
- Supervision password. Allows accessing the plant in read-only mode.

Passwords are case insensitive, therefore it does not matter if they are set using capitals or lower case characters. They can be sequences of characters and numbers, without length limit. A void password will not be set. When creating a new plant, both passwords are not set.

There are four possible scenarios

1. No password set: Anybody can operate all the plant functions.
2. Both passwords set: Only those who know the supervision and control passwords, or the administrator, can access the plant. It is possible to send control inputs, write parameters, and modify the configuration of anybody who knows the control or administrator password.
3. Only the supervision password is set: It is possible to access the plant, send control inputs, write parameters, and modify the configuration of anybody who knows the supervision or administrator password.
4. Only the control password is set: Anybody can access the plant. It is possible to send control inputs, write parameters, and modify the configuration of anybody who knows the control or administrator password.

It is recommended to protect the plant by setting at least the control password to avoid intentional or unintentional modification of operation parameters or sending unwanted control inputs.

3.1.2.7.5 Step 5

This step is for configuring the number and the type of boards for the plant. Boards can be added to or deleted from the list, or deleted. The list should include all the SICES boards to be monitored. To add or modify a board, use the "Step-by-Step Procedure to Modifying a Board", described in 3.1.3.7. The list provided for this operation sums up all the most relevant features of the boards listed: The type of board (DST4600, EM1100, etc.), the address for serial communication (to enable several boards to share one communication channel) and the name they have been assigned. From the list, it is possible to notice immediately common error causes, like duplicating serial addresses or wrongly assigning a board type (DST4600 instead of DST4600A, etc.).

There are three buttons on the right hand side of the list to add, modify or delete boards: they are easily recognizable and have a descriptive icon.

3.1.2.7.6 Step 6

This last step is for configuring those options that SicesSupervisor is not able to acquire from the boards, or for which it cannot determine from which board to acquire them. Especially for those plants consisting of more than one board, SicesSupervisor should be directed towards acquiring information that cannot be automatically linked to one board, like, for example, electric mains voltage measurements. These measurements could be made by all the boards of the plant, by only one, or by none (if there is an external device to acquire them).

Therefore, the following elements should be determined:

- The type of plant, choosing among:

- Emergency: The "unifilar" window will show the electric mains icon, the users' icon and an interlocked switch.
 - Production: The "unifilar" window will not show the electric network icon, but the user icon without switches.
 - Parallel to the network: The "unifilar" window will show the electric mains icon, the users' icon, a switch connecting the users to the electric network and a switch connecting the group(s) with the users (in this case, the two switches are not interlocked).
- Number of plant phases. Many boards contain this information, but not all of them. This type is used to enable/disable the display of the electric mains voltage measurements L2-L3 and L3-L1 in the "unifilar" window.
 - Nominal voltage. Some boards contain this information, but some do not. This rating can be used to set the end scale value of the dials displayed in the program pages.
 - Which board has the network sensor. If more boards are used, this allows setting the board from which SicesSupervisor can acquire the electric mains statuses and measurements. If there is only one board in the plant to manage the generator set, this will be the one to be set. If no boards are set for this parameter, the electric mains icon in the unifilar diagram will be displayed as disabled.
 - Which board controls the mains switch. If more boards are used, this allows setting the board from which SicesSupervisor can acquire the status for the switch connecting users to the electric mains. If there is only one board in the plant to manage the generator set, this will be the one to be set. If no boards are set for this parameter, the electric mains switch icon (or the right side of the switch in case of "emergency" plants) will be displayed as disabled in the unifilar diagram.
 - Which board has the group switch. If more boards are used, this allows setting the board from which SicesSupervisor can acquire the status for the switch connecting users to the groups. This is not the machine switch, but the switch to close the parallel lines of the user sets. If there is only one board in the plant to manage the generator set, this will be the one to be set. If no boards are set for this parameter, the group switch icon (or the left side of the switch in case of "emergency" plants) will be displayed as disabled in the unifilar diagram.

3.1.3 Board Configuration

The "board" resource does not have any connected passwords, because it uses the passwords for the plant of which it is a "child". If the plant has a control password, this is required for all the operations described below. If the plant does not have a control password, but a supervision password, this is required for all the operations described below.

3.1.3.1 Adding a Board

A board can only be a "child" of a plant. It is therefore essential to set a "parent" plant before being able to add a new board:

- Click on the "parent" plant in the resource hierarchy, then, click on the arrow at the right of the "Add" button on the toolbar, and finally on "Board".
- Click on the "parent" plant in the resource hierarchy, then on the menu "Plants -> Add -> Board".
- Right click on the "parent" plant in the resource hierarchy, then select "Add -> Board" from the context menu.

- From step 5 of the "Step-by-Step Procedure to Modifying a Plant" (3.1.2.7), click on the "Add" button.

When creating a new board, SicesSupervisor names it with a unique number. It is advisable to change it immediately with a more recognizable name. To perform this operation, follow the step-by-step procedure described in 3.1.2.7.5

3.1.3.2 Modifying the Properties of a Board

To perform this operation:

- Click on the relevant board in the resource hierarchy, then on the "Property" button in the toolbar.
- Click on the relevant board in the resource hierarchy, then follow the "Plants -> Properties" path.
- Click on the relevant board in the resource hierarchy, then click F4.
- Right click on the relevant board in the resource hierarchy, then select "Properties" from the context menu.
- From step 5 of the "Step-by-Step Procedure to Modifying a Plant" (3.1.2.7), click on the relevant board in the board list for the plant, and then click on the "Configure" button.

To perform this operation, follow the step-by-step procedure described in 3.1.2.7

3.1.3.3 Renaming a Board

To perform this operation:

- Follow the modification procedure described in the previous section.
- Click on the relevant board in the resource hierarchy, then click F2. This allows changing the name of the board directly from the folder display. See notes on the plant name in section 3.1.2.7.5

3.1.3.4 Deleting a Board

To perform this operation:

- Click on the relevant board in the resource hierarchy, then on the "Remove" button in the toolbar.
- Click on the relevant board in the resource hierarchy, then follow the "Plants -> Remove" path.
- Click on the relevant board in the resource hierarchy, then click "Canc" or "Delete".
- Right click on the relevant board in the resource hierarchy, then select "Remove" from the context menu.
- From step 5 of the "Step-by-Step Procedure to Modifying a Plant" (3.1.2.7.1), click on the relevant board in the board list for the plant, and then click on the "Remove" button.

SicesSupervisor asks for confirmation before proceeding.

3.1.3.5 Duplicating a Board

To perform this operation, first select a "source" board to be duplicated. Then:

- Click on the "source" board in the resource hierarchy, then on the "Duplicate" button in the toolbar.
- Click on the "source" board in the resource hierarchy, then follow the "Plants -> Duplicate" path.
- Right click on the "source" board in the resource hierarchy, then select "Duplicate" from the context menu.

SicesSupervisor then displays a window where to select the "parent" plant for the new board (that is where the board will have to be copied). The new board will be named with a unique number. This name can be changed immediately with the procedure described in 3.1.3.7.

3.1.3.6 Moving a Board

To perform this operation:

- Click on the relevant board in the resource hierarchy, then follow the "Plants -> Move" path.
- Right click on the relevant board in the resource hierarchy, then select "Move" from the context menu.

SicesSupervisor then displays a window where to select the "parent" plant where to move the selected board. The moved board will keep its name. If there is a board in the destination plant with the same name of the selected one to be moved, the operation will not be completed.

3.1.3.7 Step-by-Step Procedure to Modifying a Board

This procedure (valid for all the board types) consists of four steps: the last one will allow accessing a further procedure, which is specific for each type of board.

3.1.3.7.1 Step 1

This step is for setting:

- A name for the board. This should be a unique name in the "parent" resource. Only "child" boards can share the same name provided that they are located in two different plants. In addition, it is important to notice that this name will be used for naming a folder on the hard disk. It is essential to use only characters that can be used for naming folders in Windows operating systems (for example, ? / and \ are not valid characters). If an already existing or invalid name are used, an error message will be displayed. The same will happen if the folder was not successfully created or renamed (for example, if "Explorer" is open for the selected folder).
- A description. This is not used by SicesSupervisor, and can be skipped. It is available only to allow for a more exhaustive resource description than just the name.

3.1.3.7.2 Step 2

This step describes how to reach the board via Ethernet. It can be skipped if another communication channel is used.

To use Ethernet, the plant must be equipped at least with a "ModBus TCP Gateway" board, which will be the interface between the Ethernet network and the board serial port. On the serial side, the "Gateway" can be configured as RS-485: This allows (although this is not compulsory) connecting all the remaining plant boards to one Gateway only.

Since the "Gateway" is just a connection between the Ethernet and the serial line, most of the times it does not carry any relevant information for the plant. It is therefore possible to exclude it when configuring the SicesSupervisor plant. SicesSupervisor is already able to communicate directly with the "Gateway" downstream boards just by setting the IP address and the TCP port (see below) of the "Gateway" they are connected to. In fact, the "Gateway" has four digital inputs and four digital outputs. If these in/outputs are connected to something relevant, it is then possible to list the "Gateway" together with the SicesSupervisor boards. It will then be possible to monitor its inputs and control its outputs with the supervision software. In this case, since the "Gateway" is for SicesSupervisor just another board, its IP address and TCP port will have to be set in this step. NB: This operation is to set communication between "Gateway" and SicesSupervisor. The IP address and the TCP port will have to be assigned with a different software.

It is possible to use the system also via Internet. In order to do this, the "Gateway" needs to be configured with a static IP address (the same unique address on the Internet). These addresses must be **purchased** from the competent suppliers. Once the IP address has been purchased and the "Gateway" has been configured, it will be possible to connect to the plant via Internet using SicesSupervisor (not Internet Explorer).

- IP Address: Set the IP address configured for the "Gateway" to which the board is connected (or the user IP address if the board is the "Gateway").
- TCP Port: Set the TCP port configured for the "Gateway" to which the board is connected (or the user TCP port if the board is the "Gateway"). This parameter should always be 502 (see the "Gateway" manual).

3.1.3.7.3 Step 3

This step is for configuring the serial address for board communication. It is an eight bit number (0..255) that allows to univocally identify a board on an RS-485 line. It is also used on the RS-232 line.

Using a specific communication protocol ("Step-by-Step Procedure to Modifying a Plant") limits the addresses that can be used:

- MODBUS RTU Protocol: It supports addresses between 1 and 247
- DST4600 Protocol: It supports addresses between 0 and 9

Each board has its own specific procedure for the local setting of the address:

- DST4600: Exclusively uses the address zero
- DST4600A: The address can be configured with the parameter P.37. By default, this address is 1.
- DST4601: The address can be configured with the parameter P.452. By default, this address is 1.
- EM1100: The address can be configured with the parameter P.59. By default, this address is 1.
- DST4400: The address can be configured with the parameter P.452. By default, this address is 1.
- ModBus TCP Gateway: It uses a fixed address equivalent to 255, which is an exception to the ModBus protocol.
- Telesegnali: If it is directly connected to the RS-485 line, it uses four dip switches for configuring the address (1-16). If it is connected to the second serial port of a DST4600A or DST4601 board, it uses the same address of the board it is connected to.
- GDC: If it is directly connected to the RS-485 line, it uses four dip switches for configuring the address (1-16).

3.1.3.7.4 Step 4

This step is for configuring the board type. It is possible to select a type among those supported by SicesSupervisor from a drop down menu:

- DST4600
- DST4600A
- DST4601
- DST4400
- EM1100
- Telesegnali
- GDC
- ModBus TCP Gateway

There is also a button ("Details") to enable the configuration procedure for the selected type of board. This procedure will be described in the chapter about board types.

3.2 Visibility of the PC on the Plants

It is possible to make the PC where SicesSupervisor is installed interact only with some of the configured plants. This can be appreciated especially if sharing data and configurations online. It is however possible to use this function even when using just one PC, for example to prevent operators from displaying/interacting with plants they should not supervise. Since this function is mainly connected to data networking, it is described in “10 - Networking”.

3.3 Data Organization and Networking

Since revision 2.00 of SicesSupervisor, the organization of data on the hard disk has radically changed. This reorganization has been designed to allow data networking among more PCs on an Ethernet network.

See also “10 - Networking”.

3.3.1 Data Organization

To manage most of the information, SicesSupervisor uses Access 2000 databases to store and configure data. Some of these databases are protected by passwords (database configuration) and cannot be displayed nor modified by Access. Others can be accessed freely (databases for data, languages, etc.).

The decision to adopt a database to store data was made given the need of providing data in a format that could be used not only by the supervision program. This allows external operators creating (via Access) customised analysis tools or tools to manage the collected data and that are not available in SicesSupervisor. The decision to adopt Access 2000 as database format was made by its wide availability on PCs (while databases like Oracle and SQL Server are not usual on PCs, but rather on servers).

When installed, SicesSupervisor creates a subfolder inside its program folder (typically “C:\Programs\Sices\SicesSupervisor”), named “**SharedData**”. This folder stores the configuration database (SicesConfig.mdb) and the database with the dialled/received call list related to the plants (SicesLogs.mdb). In addition, there is always a subfolder named “\$\$”, root container for all the resources described in the previous chapter. The “\$\$” subfolder contains,

in hierarchical order, folders associated to all the configured containers, plants, and boards, with the name of the connected resource. Container and plant folders never contain stored data. Board folders contain log data acquired from the PC during the connection and also data acquired from board history log. See also “10 - Networking”. NB: Not all the types of boards have log files (only DST4600A, DST4601 e DST4400).

Log data, both recorded by the PC or acquired by the boards, are stored in databases using a common naming system:

- B_YYYYWW.MDB for the log data recorded by the boards
- D_YYYYWW.MDB for the log data recorded by the PC

YYYY stands for the year of the stored data, WW for the week in the year (1 is the first week, 52 is the 52nd). For example, the B_200347.mdb contains data recorded in the 47th week of 2003, from Sunday 16.11.2003 to Saturday 22.11.2003 included. Only for data recorded by the PC, there is another database (TRIGGER.MDB) containing only fast interval PC recordings (see board documentation).

A weekly organization of the database is the ideal compromise between data fragmentation and database size. Access does not allow using very big databases, as this might affect performance negatively. On the other side, a daily fragmentation of data would entail a high number of .MDB files.

D_YYYYWW.MDB and TRIGGER.MDB database format is a standard one, and is common to all boards. It contains:

- An “Events” table, with the log of the events, recorded each time there is a modification. This table stores the date/time of the event, the event code, an associated value (for example, if the event is the motor status change, the new value is this mew status), and a field for faults, used for recording if the event has been noted. Codes associated to the events and the connected values change from a board type to another.
- A “Trends” table, containing periodical recordings of the plant measurements. This table has a column for the date/time of the recording and as many columns as the measurements to be stored. The number of columns associated to the measurements and the measurements themselves change from a board type to another.

In the TRIGGER.MDB database, the “Events” table is always empty.

“B_YYYYWW.MDB” database format is also a standard one, and is common to all boards. It contains:

- An “Events” table, with the log of the events, recorded each time there is a modification. This table stores the date/time of the event, a unique number ID (timestamp) for the event, and the event code. There are also other fields containing auxiliary information about the event, unique to each board.
- A “Trends” table, containing periodical recordings of the plant measurements. This table stores the date/time of the recording, a unique number ID (timestamp) for the recording, and the type of recording (event recording, periodical fast interval recording or periodical slow interval recording). There are other fields containing recorded measurements, unique for each type of board.

3.4 Communication Device Configuration

To communicate with the plants after their configuration, a communication device among those on the machine must be set in SicesSupervisor. SicesSupervisor manages as communication devices all the serial ports (both physical and virtual serial port, USB or PCMCIA), modems contained in the list on the control panel, and the network board (if there is one).

3.4.1.1 Selecting and Configuring a Communication Device

To select a communication device, click on the "Communication → Select a communication resource" menu.

3.4.1.2 Procedure for Communication Device Configuration

This procedure consists of two steps.

3.4.1.2.1 Step 1

For this first step there is a list of communication devices detected by SicesSupervisor on the PC. To select one, tick the box on the left hand side of the name. After selecting it, it can be configured by clicking on "Configure". This button might not be enabled if the options of the selected device cannot be modified (for example, Ethernet).

Click on "Configure" and SicesSupervisor will open the system configuration window (which would open also if configuring a device from Windows Control Panel). Therefore, the interface and the available options depend on the operating system (Windows 98, 2000, XP, etc.) and on the device (different modems have different configuration windows). Below, some general advice for configuring the devices.

- Serial ports: Disable the flow control, while all the other options (baud rate, number of data bits, parity, number of stop bits, etc.) should be configured as for the boards. The general standard for these settings is respectively: 9600 bauds, 8 data bits, 1 stop bit and 0 parity bits. These settings are default also for some SICES boards. Refer to the board manual to check that all the boards of the plant and the PC COM port are configured in the same way.
- Modem:
 - It is advisable to refer to the modem manual.
 - Always use the specific modem for the driver and not the standard Windows one (as the latter does not enable configuration and access to many modem parameters, which may then result in being incorrectly set).
 - The configuration of the modem should enable it to negotiate error correction and data compression with the plant modem. Some modems do not support or disable by default this negotiation, therefore when the plant modem tries to negotiate, the connection is lost. It is often necessary to use the modem AT commands (see manual) to check if negotiation is enabled or to enable it. For many modems, this command is named "AT &M" (not on all of them).
 - After enabling the negotiation, enable (if possible) both error correction and data compression. If this configuration does not enable communication, try to disable the correction and alternatively the compression, and eventually both.
 - If there is a GSM modem on the plant, it might be useful (if not necessary in some cases, like with ISDN modems) to limit the speed of the 9600 Baud port.

3.4.1.2.2 Step 2

This step is for setting a number which entails different functions based on the device selected in the previous step. If it is a serial port, no number can be set for this step.

If it is a modem, it is possible to set a number for telephone rings after which the PC will automatically answer incoming calls. By setting zero, the PC never answers automatically, but the operator must intervene (the operator gets a signal each time there is an incoming call). Typically, the setting value is 1, but it is possible to set a higher number if the line is shared with other telephones and they get answering priority. **NB: the PC will not answer if the option for data calls is disabled in the license key.**

For Ethernet devices, when a board needs to communicate with a PC, the "Gateway" it is connected to sends a message to all the PCs on the Ethernet network, until one of them connects to the plant. If all the networked PCs would answer the call, there would be a useless, overloaded network traffic (only the answer of one PC is needed, as the other ones will be able to access data via networking). This parameter is to set the number of messages sent to the "Gateway" before the PC needs to connect to the plant. Each PC will have a different setting, and the lower number will be assigned to the PC that should always answer (except for when it is busy or off). The other PCs will answer only if the PC with the lower number cannot. Obviously, this all makes sense if using device networking. If the value is set to zero, the PC will never answer to Ethernet calls. **NB: the PC will not answer if the option for data calls is disabled in the license key.** However, even if more PCs are enabled to answer simultaneously, no data will be lost, but the Ethernet network will be unnecessarily overloaded.

The program can operate with only one communication device at a time (i.e., it is not possible to connect a serial port and a modem). An exception is an Ethernet network plus modem, which can be managed simultaneously.

By default, plants configured with a 127.0.0.1 IP address (loopback address) use a modem connection, while those with a valid address use an Ethernet connection.

To differentiate and identify which plants are connected via Ethernet and which ones via modem, SicesSupervisor displays a yellow folder for plants with modem connection, and a red one for the Ethernet connection.

3.5 Administration Password Configuration

SicesSupervisor allows protecting the plants with individual passwords (supervision and control ones, see "Step-by-Step Procedure to Modifying a Plant") to avoid unauthorised access. A general password - named administration password - is used to protect everything but plants or boards. This password allows:

- Managing the "containers" (tools to group plants logically).
- Override individual plant passwords.
- Select data networking options.
- Select PC visibility on the plants.
- Send specific commands to the boards.

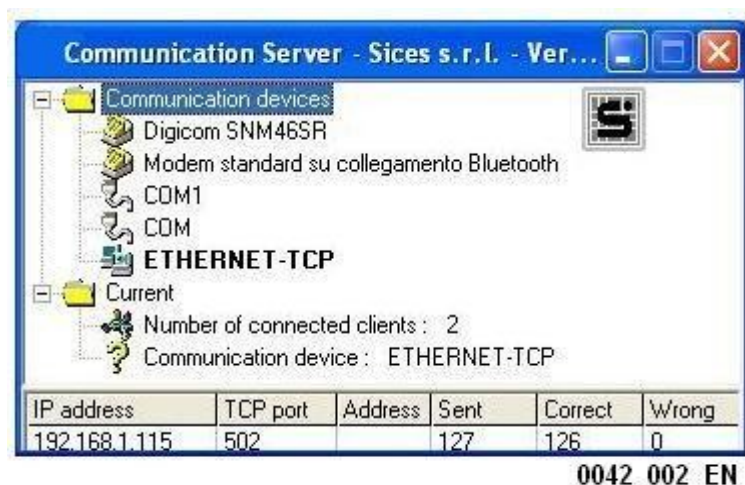
3.5.1 Administration Password Modification

To change the administration password (recommended at first installation), click on the "File → Change administration password" menu. A password should be already set before being able to modify it. The default password is "ADMIN". The modification window does not show the password typed in (it displays asterisks): The password must be typed twice and is only accepted if the two typed password are the same.

3.6 Setting the License Key

A license key is automatically required when installing SicesSupervisor if no previous version had been installed on the PC. If a previous version had been already installed, the application will try to use the previous license key. It will request a new one only if the previous one is not valid. However, a license key can be changed even when using the application (for example, to add new functions to the program). New keys must be purchased from S.I.C.E.S. s.r.l. . To change a license key, click on the "? → About" menu in the program. The info window of the program will be displayed. At the bottom, it will show the options enabled by the current key. It has a button ("License Key") to display the window where to change the key.

4. Description of the COMMUNICATION SERVER Window

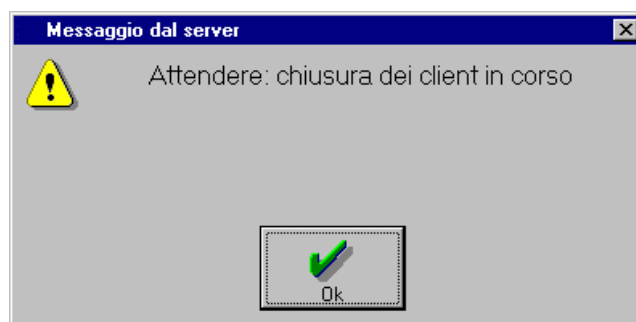


The figure shows the COMMUNICATION SERVER window. At the top, all the communication devices available on the machine are displayed (the one currently selected is highlighted in bold). "Number of connected clients" shows how many connections are currently open between the COMMUNICATION SERVER program and the SUPERVISOR program. **Attention:** The SUPERVISOR program can use more than one connection towards the COMMUNICATION SERVER program. Typically, it uses one for the COMMUNICATION SERVER configuration and one for managing data for each plant board. This means that if the SUPERVISOR is monitoring a plant, this number will be greater or equal to 2, otherwise it will be 1.

The grid in the bottom part of the window is only displayed if the application is communicating with a plant. This grid consists of six columns. The first three columns are for identifying a board in the plant ("IP Address" and "TCP Port" only display values if the selected communication device is the Ethernet). The third column corresponds to the serial address for more boards on one communication bus (RS-485). The three other columns show the communication statistics for all the plant boards: They show the total number of sent messages, and of correct or wrong/missing answers. These columns are very useful for detecting communication problems. Communication statistics for a board can be reset to zero by double-clicking on one of the columns of a line connected to the board.

4.1.1 Closing the COMMUNICATION SERVER

Click on the standard exit button in the window (marked by an X, on the top right hand side) to close the COMMUNICATION SERVER. Before closing, it sends a closing command to the SUPERVISOR program currently connected. This should be immediate. Sometimes, the SUPERVISOR is busy and cannot perform this command immediately. In this case, the COMMUNICATION SERVER displays the following window:



The window will close automatically when the SUPERVISOR closes. However, the operator can close the COMMUNICATION SERVER without waiting for the SUPERVISOR by clicking on OK.

4.1.2 Closing the COMMUNICATION SERVER Automatically

The COMMUNICATION SERVER closes automatically when the SUPERVISOR is not connected anymore.

5. Description of the SUPERVISOR Window



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The main SicesSupervisor window is structured in a similar way to the Windows Explorer one. It will then be familiar to the majority of users. It consists of five main parts:

1. **Menu Bar:** It contains all the controls and options that can be activated by the supervision, ordered by function inside each menu.
2. **Toolbar:** It allows faster access to the most frequently used commands (which can be found also in the menus). It makes using controls easier as it assigns a descriptive icon to each control.
3. **Status Bar:** Located in the bottom part of the window, it contains updated information about the application current status. This information is organised in "panels". Some of these panels support some commands as well (which can be activated by clicking on them).
4. **Resource Window:** Located in the left side of the window, it displays hierarchically the resources that can be used by the application. It mirrors the Windows Explorer interface showing the folder view for one or more disks. Each resource is displayed with its name and an icon for its category. The colour and the bold font provide further information on the resource use.
5. **Property Window:** Located on the right hand side of the window, it works constantly together with Resource Window. It displays all the properties for the resource currently highlighted in the Resource Window.

The space for the two windows can be adjusted: To adjust the space for each window, drag with the mouse the separating line towards the left or the right.

5.1.1 Menu Bar

It contains all the controls and the options that can be activated by the application. The menu item status is not always the same and depends on the current state of the application. Some menu items can be invisible or disabled (displayed in light grey) at times, and visible and enabled at other times.

5.1.1.1 File Menu

- **Change Administration Password:** It allows modifying the administration password. It requires the administration password (see 3.5.1).
- **Network Configuration:** This menu item is shown only if the Ethernet configuration and data networking is enabled by the license key. It requires the administration password. It allows accessing the step-by-step procedure to configure the sharing.
- **Perform Server Database Backup:** This menu item is shown only if the Ethernet configuration and data networking is enabled by the license key and only if SicesSupervisor is configured to use this networking. It requires the administration password. It allows creating a local copy of the plant configuration database (stored on the DATA SERVER PC). This enables temporary operation of SicesSupervisor also when the DATA SERVER is not available in the network. NB: This is never an automatic SicesSupervisor operation, as this would overload the network and it would take too long on slow networks.
- **Select the plant to be managed:** It allows selecting plants to interact with the PC (see Networking Management).
- **Communication check for ethernet connected device:** It allows activating a specific check on the communication status among networked devices. This option should be activated on the "Gateway" (using the MDGConfig program). Basically, SICES boards send cyclic messages and the PC checks they have been correctly received. If after X minutes (this value can be directly set from this window), no messages have been received, an item will be recorded in the call history log. If the value is set to 0, checks will be disabled.
- **Exit:** It allows closing the SUPERVISOR program and indirectly the COMMUNICATION SERVER, therefore the whole application. It has its equivalent on the toolbar.

5.1.1.2 View Menu

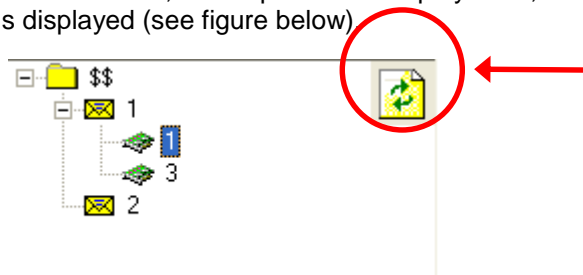
- **Toolbar:** It allows displaying/hiding the toolbar.
- **Status Bar:** It allows displaying/hiding the Status bar.
- **Calls history log:** It allows opening a window displaying a log of all the PC outgoing or incoming calls.

5.1.1.3 Plants Menu

This menu always works in connection with the device selected in the Resource Window. It can also be activated as context menu by right-clicking on it.

- **Update:** It updates the Resource Window. If sharing data with other PCs, the program can be configured so that the Window is not automatically updated by the network plant database. This will avoid overloading the network and this command will be instantly updated.

There is an automatic control that can check if the plant configuration has been modified by other users. In this case, in the plant tree display area, in the top right corner, an update icon is displayed (see figure below)



Click on this icon to update plant configuration.

If the automatic update option is activated, this icon will not be displayed since the configuration synchronization is automatically updated approximately every minute.

- **Add:** It allows adding one resource to the application. It is only enabled if the resource currently selected on the Window can have "children" resource. For example, a container can contain other containers or plants, a plant can contain boards, but a board cannot contain anything. It does not perform any operations, but it displays a submenu that allows selecting the resource to be added (only those resources that can be actually added to the one currently selected will be enabled). It has its equivalent on the toolbar. It may require a password, depending on the level the resource is added.
- **Move:** It allows moving the currently selected resource inside another "parent" item, be it a container, a plant, or a board. It requires a password for the resource to be moved, and another password might also be required depending on the level the resource is moved to.
- **Duplicate:** It allows duplicating the resource currently selected, be it a container, a plant, or a board. All the resources that are "children" of the selected one will also be duplicated. It is also possible to duplicate a resource in a different context, that is a board can be duplicated from one plant to another. It requires a password for the resource to be duplicated, and another password might also be required depending on the level the resource is duplicated to.
- **Properties:** It allows modifying an application resource. It allows accessing the step-by-step configuration procedure related to the resource to be modified. It has its equivalent on the toolbar. It requires a password connected to the specific resource (if there is a password).
- **Remove:** It allows deleting an application resource. It has its equivalent on the toolbar. It requires a password connected to the specific resource (if there is a password). NB: It also deletes all the resources that are "children" of the selected.
- **Open:** This item allows displaying/hiding a whole plant (when the plant is displayed, the resource and the property windows disappear and a window with the unifilar diagram will be displayed). This item is only enabled if the selected resource is a plant. It has its equivalent on the toolbar.
- When a plant is open, this menu also displays the names of all the boards of the plant. A detail window will open by clicking on one of the boards.

5.1.1.4 CommunicationMenu

- **Select a communication device:** It allows selecting one of the communication devices as current.
- **Connect:** This item is for sending the COMMUNICATION SERVER a control to connect to/disconnect from the plant. It is only enabled if one of the communication devices is selected and if the resource selected in the window is a plant. It has its equivalent on the toolbar.

5.1.1.5 ? Menu

- **About:** It allows displaying a window with information about the program and S.I.C.E.S. s.r.l.

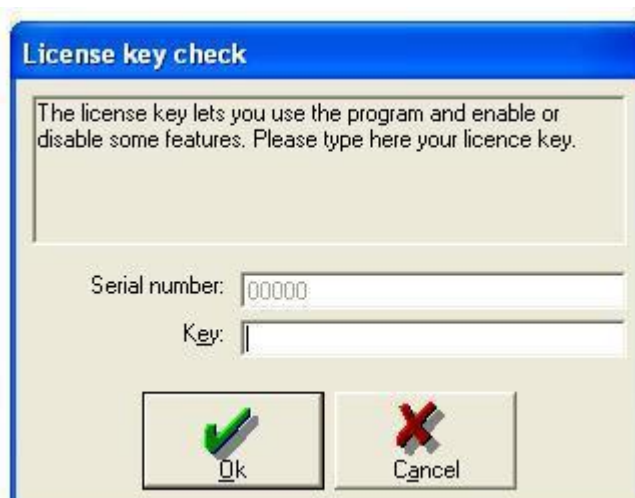


In the top part of this window, the application properties are displayed (name, software version, etc.)

The central area of the window displays links to the website and e-mail address for S.I.C.E.S. s.r.l.. In the bottom part of the window, the options for which the application is configured for are displayed: It is specified if it is enabled to work with parallel type plants and to receive data calls from the plant. It is also specified if it is enabled for network data and configuration sharing.

The window will be closed by clicking on "OK".

By clicking on "License key", SicesSupervisor will display the following window:



This window can be used for displaying the serial number and the current license key. From here, a license key can also be changed if another one to add functions to the program has been purchased from S.I.C.E.S. s.r.l..

5.1.2 Toolbar

The toolbar is a quick, intuitive and immediate tool to perform the most used commands, without using the menu bar. Any of the commands on the toolbar can be found in the menu bar. The bar consists of a series of buttons. Each button has an icon and a description to explain its purpose. What follows is a list of buttons: It is complete with the icon, the name, and the menu control to activate the same function

- **Add:** It can also be activated via the "Plants → Add" path.
- **Duplicate:** It can also be activated via the "Plants → Duplicate" path.
- **Properties:** It can also be activated via the "Plants → Properties" path.
- **Remove:** It can also be activated via the "Plants → Remove" path.
- **Connect:** It can also be activated via the "Communication → Connect" path.
- **Show:** It can also be activated via the "Plants → Open" path.
- **Zoom:** It can also be activated via the "Plants" → board names path.
- **Reset:** It resets the alarms. The alarm is reset directly on the board generating it. The plant generating the alarm must be selected.
- **Exit:** It can also be activated via the "File → Exit" path.

5.1.3 Status Bar

The Status bar is located on the bottom part of the window. It displays updated information on the application status. It is divided into "panels". Each panel displays a status information. Some panels might also work as control panel if one clicks on it.

The current version has five panels. From left to right:

- **Communication Device:** It always shows name and status of the selected communication device. If no device is selected, an orange background will be displayed.
- **Networking:** It always displays the current networking status. If the networking option is not enabled by the license key or by the configuration options, this panel is not displayed.
 - Network Operation (host name): If the DATA SERVER is available.
 - Local Operation: If the DATA SERVER is not available.

By clicking on this panel, a context menu will be displayed: This allows performing a check on the DATA SERVER availability.




- **Access Level:** It displays the current access level to the system. This level can be:
 - None.
 - Supervisor: It enables displaying the selected plant
 - Command: It allows displaying, controlling, programming and configuring the selected plant.
 - Administrator: It allows any operations.

By clicking on this panel, a context menu will be displayed: It allows selecting the desired access level. If a level higher than the currently set is selected, the password for the relevant access level will be required.

- **New incoming calls:** It shows if new incoming calls from the plants have been received (possibly, faults). It is grey if there are no new incoming calls, and it will display an 'envelope' icon if there are some incoming calls. By clicking on this panel a Calls history log for the incoming and outgoing calls will be displayed (it can also be accessed via "Show → Calls history log") and the message deactivated.
- **New faults:** It shows if there are faults on the plant during connection. It is grey if there are no faults, otherwise a red triangle icon will be displayed. By clicking on it, the message will be deactivated.

5.1.4 Resource Window

This item displays a diagram with all the resources that are available for the application. They are displayed in a tree structure similar to the one used by Windows Explorer. There is a main folder ("\$\$") including all the resources. As described in 3.1, there are three types of resources:

-  **Container**
-  **Plant**
-  **Board**

Each resource is displayed with a related icon and its name. The colour of the name show the current use:

- **Black:** Resource not used.
- **Blue:** Resource used in supervision.
- **Green:** Resource used in supervision. There is an operation in progress that cannot be paused.
- **Red:** Resource used in configuration.

In addition, if the colour is not black, the bold format shows if the resource is being used on that PC (bold) or another one (not bold, and if the network sharing is enabled).

By clicking on a resource, the menu items are enabled (and the relevant buttons on the toolbar) for the operations possible with that resource. When a resource is selected (blue or grey background with the resource name), click F2 to change its name by typing directly on the old one.

The plant window status is stored. When re-starting the program, this allows to display the same status as when closing the program.

5.1.5 Properties Window

This item display in a table all the configurations performed on the resource name, etc.) The number and type of displayed information vary according to the resource they refer to. Since they are self-explanatory, they will not be described in detail. It has to be noted that if the resource is a board, only those configurations that apply to all the types of boards (i.e., serial address) will be displayed, but not the specific ones.

It is not possible to perform any operation on the Properties window. Its only purpose is to display information.

6. Working on a Plant

Before working on a plant it is necessary to create and/or configure it (see 3.1). If you need to connect and download data from a plant, first select and/or configure a communication device (see 3.4).

Once the plant has been created, you can work on it. In the resource window, select the plant by clicking on it or on one of the related boards. Now click on the "Show" button on the toolbar or select "Open" from the "Plant" menu or from the context menu.

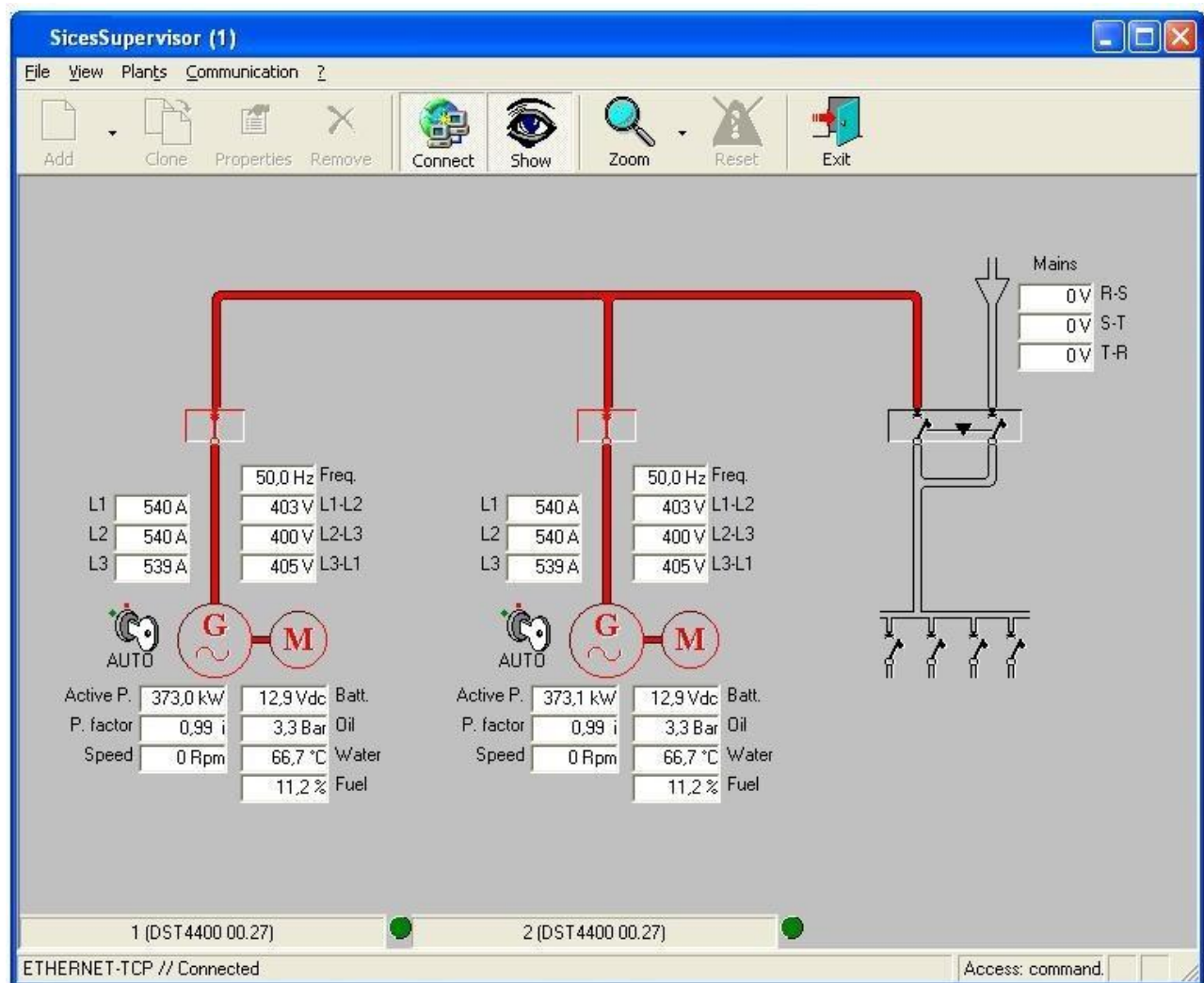
The plant unifilar diagram will then be opened (the "Show" button will remain pressed and the "Open" item will be ticked). To stop working on the plant repeat the same procedure (click on the "Show" button on the toolbar or on "Open" from the "Plant" menu).

Starting from the window that displays the plant unifilar diagram it is possible to display one or more boards in detail: click on the relevant board name from the "Plant" menu or from the drop down menu which can be displayed by clicking on the arrow located on the right of the "Zoom" button on the toolbar. SicesSupervisor will open a new window for each board. This window will remain active until the operator closes it or the "unifilar" window is closed, as described below.

After opening a plant, you can choose whether to work off-line (not connected to the plant via the communication device) or on-line. If you choose to work off-line, only history logs acquired during previous connections will be available. A communication device must be selected to be able to work on-line (the name of the device should be displayed on the first panel on the left of the status bar): Now click on the "Connect" button on the toolbar or select "Connect" from the "Communication" menu. During the connection phase a window is shown to indicate the connection progress. This window will be displayed only for a moment if the communication device is not a modem. If the connection was successful, after a few seconds SicesSupervisor will start displaying the data acquired from the boards. During this phase, the "Connect" button will remain pressed and the menu item "Connect" will be ticked. To go back to off-line operation repeat the same procedure (click on the "Connect" button on the toolbar or on "Connect" from the "Communication" menu).

6.1 Description of the "Unifilar" Window

The "unifilar" window is the main window of the program. Its configuration varies according to the number of boards that compose the plant and to the type of plant, but it has a standard aspect consisting of vertical bands. These bands constitute distinct areas that run vertically across the whole window. There is an area for each board that manages a gen-set, an area for the electric mains, changeover and users and, if need be, an area shared by all boards not managing any gen-sets. Below you will find an example of a window for an emergency plant composed of two parallel gen-sets, using a Gateway board for auxiliary status acquisition.



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This example shows the window structured in four vertical bands: one for each DTS4601 board (each managing a gen-set), one for users, electric mains and changeover and the last one for the Gateway board (not managing any gen-sets).

Each board has a small bar displaying its name, type and software release. The bar also features an indicator light that changes its colour every time SicesSupervisor receives a correct answer from the board. Therefore, in a normal situation all the indicator lights should be flashing.

The information associated with the boards depend on the boards themselves and on their programming. However, the structure of a band for a board managing a gen-set (DST4600, DST4600A, DST4601, DST4400, EM1100) is always the same and shows:

- An icon for the engine, whose colour also indicates its status:
 - Black: stopped
 - Red: running
 - Blue: cooling phase in progress
 - Fuchsia: start-up or shut-off phase in progress

By rolling on this icon, some additional information on the engine will be displayed in tooltip format (start-up counter, working hours, hours to maintenance, etc.) NB: the additional information displayed depend on the board, software version and protocol used.

- An icon for the gen-set, whose colour also indicates its status:

- Black: no voltage



- Red: voltage present



- A machine breaker (it may visible or not, it depends on the plant type, board type and number of gen-sets in the plant).
- An icon representing the key selector switch on the front panel of the board (only if provided).
- The voltage, current and frequency values measured on the gen-set (displayed on a red background if they do not comply with the tolerance thresholds set in the boards).
- The power values (if the board supports them). If the board allows for power measurements, the window normally displays the active power and power factor (followed by "i" if the load is inductive, or "c" if it is capacitive). By rolling on the active power value also the reactive power, apparent power and the energy counter(s) will be displayed as tooltips.
- Some auxiliary engine-related measurements (voltage of start-up battery, coolant temperature, lubricating oil pressure, fuel level in the tank, rpm, voltage from the battery charger alternator). The type and number of measurements displayed depend both on the board type (not all the boards acquire these values) and on the board programming (data acquisition may be enabled/disabled by means of the board parameters).

The boards not managing any gen-sets share a same band, to avoid making the window structure too complicated. For this reason, when configuring these boards you will need to select explicitly which information you want to be displayed in this band. Information can only be represented physically by digital inputs and outputs. Both inputs and outputs are displayed as indicator lights followed by a description. The indicator lights are gray if the relevant input/output is not active. If active, they turn to green (inputs) or red (outputs).

The outputs can be directly controlled by clicking on the On/Off buttons (a control password for the plant is requested). If the total number of inputs/outputs to be displayed is too high they are distributed on several columns and the description is hid (it remains available as a tooltip).

The user, electric mains and changeover band varies its aspect according to the selected plant type (the part on the electric mains is not displayed for power supply plants, while the part on changeover may consists of an interlocked breaker or two separate breakers).

6.2 Using the Windows Shared by Several Boards

Generally, each board type has its dedicated detailed window. However, this detailed window consists of additional windows, some of which are standard and are shared by several boards. These common windows include:

- The window for displaying and modifying the programming parameters.
- The window for displaying the recordings upon variation made by the PC.
- The window for displaying the periodical recordings made by the PC.

These windows will be described in detail below. NB: the structure of the windows is the same for all boards sharing them, only the data displayed vary.

6.2.1 Working with the Board Parameters

Many of the boards supported by SicesSupervisor feature a local keyboard and display that, besides giving commands or displaying values and statuses, allow programming all the functional parameters of the boards themselves. The type, number and meaning of these parameters is different according to each board. Some boards protect the parameters by means of multi-level passwords, some others allow for free access to the programming. What described below is not related to any particular board (refer to the operation manual of the board for the list and explanation of the parameters).

The programming window appears as follow:


ID	Description	U.M.	value	New value
P.0001	Maker password		0	0
P.0002	System password		0	0
P.0003	User password		0	0
P.0101	Number of genset's phases		3	3
P.0102	Genset nominal voltage	V	400	400
P.0105	Genset nominal frequency	Hz	50	50
P.0106	Genset nominal power	kVA	0	0
P.0107	Genset TA ratio	/5A	500	500
P.0110	Pick-up wheel teeth number		120	150
P.0111	W' ratio		0,00	0,00
P.0112	Oil pressure sensore type		1-VDO	1-VDO
P.0113	Water temperature sensor type		1-VDO	1-VDO
P.0114	Fuel level sensor type		1-Yes	1-Yes
P.0115	D+ input enable		1-Yes	1-Yes
P.0116	Mains nominal voltage	V	400	400
P.0119	Number of mains's phases		3	3

At the bottom of the window is a toolbar with icons for 'Change', 'Copy', 'Transmit', 'Load', 'Save', and 'Print'.

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This view refers to a DST4601 board.

The window is composed of four main areas:

- **Category bar:** it organizes the parameters in folders and subdivides them according to their function. The subdivision respects the board programming menus (for boards equipped with LCD): for each menu or sub-menu of the board, a corresponding folder with the same name is displayed in this window.
- **Parameter grid.** It is displayed in the middle of the window and it consists of five columns:
 - **ID:** it shows the number associated with the parameter. It is represented by a letter followed by a dot and a number. Its function is to allow for univocal identification of a parameter, since its description may vary (in the board as well as in SicesSupervisor) according to the selected language. This ID is always indicated in the boards when displaying a parameter (while the description is only available on boards equipped with LCD display).
 - **Description:** it shows the description of a parameter. This description is as close as possible to the one displayed on the boards equipped with LCD display. It cannot be identical since descriptions on the boards are shortened due to length requirements.
 - **Units of measurements** (only for parameters concerned).
 - **Value:** this column is automatically filled in by SicesSupervisor using the values acquired from the board (when working in off-line mode the column is empty).
 - **New value:** this column allows the operator to modify the parameter value (see further on). Some rows of the column may appear to be disabled if the board parameters are protected by access codes and the correct code has not been entered (see description further on). When modifying the value of a parameter, SicesSupervisor carries out a validity check on the new value; if it is not acceptable, you will be prevented from leaving the row and the background colour turns red.
 -  **Exclamation mark.** It points out that there are differences between the values currently stored in the board (under the "Value" column) and the ones set on the PC ("New Value" Column). It is a useful function to immediately detect the presence of one or more changes to the parameters. When connecting to the board for the first time, all new values are not set yet, therefore they will be all different (the whole column appears highlighted in yellow). In this case, use the "Copy" control to acquire and transfer all the values acquired by the board to the field "New Value".

Besides, the titles of the pages which contain differences are highlighted.

- **Toolbar,** featuring the following buttons:
 - **Read:** it allows copying all the parameters from the "Value" column to the "New Value" column.
 - **Transmit:** it allows modifying the board parameters using the data contained in the "New Value" column.
 - **Save:** it allows saving the "New Value" column in an Access 2000 database. It is possible to assign a name to the database.
 - **Load:** it allows filling in the "New Value" column using the data stored in a database previously saved using the "Save" command.

- **Print:** it allows producing a report in printable format with the values of the "New Value" column. It is then possible to print it or save it as a HTML or text file.
- **Modify:** this button is available only for those boards featuring an access password from the serial port. This button allows modifying the password.
- **Access panel.** The items contained in this panel ("access code", "access level", etc.) are visible only for those boards whose parameters are protected by means of access codes. The boards DST4601 and DST4400 for example have three levels of access to programming: user, installer, manufacturer. Each level protects the access to a group of parameters and has a numeric code associated with it. To work with that board it is therefore necessary to enter the code in the "Access Code" case, and then press the "Confirm" button. As soon as the message has been sent to the board, all the parameters accessible with that code will be enabled on the grid. The "Access Level" case will show the level obtained with the code (user, installer, manufacturer).

6.2.1.1 Setting a Parameter

SicesSupervisor does not allow modifying only one parameter of the board. It needs necessarily to overwrite them all. Therefore, we recommend sticking to the following procedure to avoid any problems:



1. Open the plant in on-line mode, open the detailed window of the desired board and then open the parameter window.
2. If necessary, enter an access code for programming.
3. Wait for the current board parameter values to be displayed under the "Value" column.
4. Click on the "Read" button: the current parameters will be copied to the "New Value" column.
5. Modify only the desired parameters under the "New Value" column. The other parameters will keep the values currently stored in the board. To modify a parameter go to the corresponding case and enter the updated value.
6. Click on the "Transmit" button: all the values under the "New Value" column will be sent and stored in the board. To send all the parameters keep the SHIFT key pressed while clicking on Transmit. Otherwise, only the modified parameters will be sent.
7. Wait a few seconds and check that the modified values are displayed under the "Value" column.

Bit programming: Some parameters are programmable by bits, i.e. every bit belonging to the parameter value has a specific meaning. In this case, a bit-programming window is displayed by clicking on the parameter.

Bit-mapped parameter editing

#	Description	Status
1	022 -Overcrank	X
2	021 -Engine not stopped	X
3	005 -Belt break	X
4	017 -Overspeed (from contact)	X
5	018 -Overspeed (from pick-up)	
6	019 -Overspeed (from frequency)	X
7	025 -Fuel end (from contact)	
8	026 -Fuel end (from analog sensor)	X
9	027 -Low fuel level (from contact)	
10	028 -Low fuel level (from analog sensor)	
11	029 -High fuel level (from contact)	
12	030 -High fuel level (from analog sensor)	X
13	031 -High water temperature (from contact)	
14	032 -High water temperature (from analog sensor)	
15	033 -Max. water temperature (from contact)	
16	034 -Max. water temperature (from analog sensor)	
17	041 -Min. oil pressure (from contact)	
18	042 -Min. oil pressure (from analog sensor)	
19	043 -Low oil pressure (from contact)	
20	044 -Low oil pressure (from analog sensor)	
21	049 -High power	
22	062 -CANBUS in BUS-OFF mode	
23	064 -Fuel pump failure	
24	065 -Low water temperature (from analog sensor)	

Value (hex):

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N.B.: Do not set or modify the parameters if they are already being programmed by means of the board panel: this would entail the risk of deleting all the changes made manually in the time elapsed between point 3 and 6.

6.2.1.2 Using the Parameter Saving Functions

Saving and loading a set of parameters can be extremely useful in a lot of different situations:

- Gen-set manufacturers, installers and hirers can copy the parameters with which the board was programmed so that they will be able to track any changes made involuntarily or in bad faith.
- For documentation purposes only, each configuration (in electronic format) can be associated with its board.
- It is possible to programme more boards in the same way. When commissioning several gen-sets, all the adjustments are generally made on one gen-set at a time. After adjusting the first one, a simple click will allow you to programme the boards of the other gen-sets in the same way, so that they may start with an almost definitive configuration.

The parameter saving format is usually .mdb (Access format). Also the .PAR format can be used (format used by BoardProg.exe).

6.2.2 Working with the History Logs Recorded by the PC

When working in on-line mode, SicesSupervisor carries out two kinds of recording of the data acquired from the single boards:

- Recordings upon variation (events).
- Periodical recordings (trend).

Typical recordings upon variations are the statuses (e.g. engine statuses) and faults. Periodical recordings are represented by measurements such as voltage, currents, etc. The number and type of measurements recorded obviously depend on the board. Moreover, some types of boards do not feature periodical recordings at all. When available, SicesSupervisor allows setting two recording intervals: a fast one (expressed in seconds, default: 60 sec) and a slow one (expressed in minutes, default: 15 min). Data recorded using the slow interval are stored in a database whose name follows the format "D_XXXXX.MDB". Those data will never be deleted, unless the user expressly does it (by deleting the files). The fast recording only keeps the last 1,800 data (newer data will overwrite older data). Those data are stored in a database named "TRIGGER.MDB".

6.2.2.1 Recordings upon Variation

Recordings upon variation (events) are automatic and need no action by the user. The following window allows the user to read and analyse the recorded data.

1 - 1

Exit Commands View

Alarms reset Stop engine Remote start Start test Load Lock Synoptic Parameters Logs Exit

Events recorded by PC

Filter

From: 09/06/2009 15.39.23 To: 09/06/2009 15.40.24 Records number: 11 Refresh every (s): 0

#	Date	Time	ID	Alarm	Description	Value
00001	09/06/2009	15.39.23	30121		Operating mode	MAN.
00002	09/06/2009	15.39.27	30121		Operating mode	AUTO
00003	09/06/2009	15.39.27	30132		Engine status	Check for engine running (automatic start)
00004	09/06/2009	15.39.31	10012		Genset presence	Present
00005	09/06/2009	15.39.31	30132		Engine status	Running
00006	09/06/2009	15.39.35	30133		Changeover status	On genset
00007	09/06/2009	15.40.05	11003	New	005 -Belt break	Active
00008	09/06/2009	15.40.05	30132		Engine status	
00009	09/06/2009	15.40.05	30133		Changeover status	On mains
00010	09/06/2009	15.40.24	11002	New	021 -Engine not stopped	Active
00011	09/06/2009	15.40.24	30132		Engine status	Stop cycle ended but engine still running

Filter No filter Update Ack Print

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This window consists of three sections:

- Data grid. It contains all the recorded information, organized in columns.

- **#:** it is an auxiliary field only used to facilitate counting the recordings.
- **Date:** date when the recording was made.
- **Time:** time when the recording was made.
- **ID:** numeric value for univocal identification of the recorded measurement (the list of these values vary according to the type of board). In the example, the code "30121" is associated with the information concerning the position of the key switch of the board DST4601.
- **Alarm:** it is used only when the recorded measurement is an incorrect value. When a fault is detected the message "New" appears in this field. This means that the fault has not been analysed by the operator yet. After checking, the operator has to "acknowledge" it using the toolbar button (the message under this column will turn to "Acknowledged"). Through this simple procedure, the operators are always up-to-date about the faults occurred when they were absent.
- **Description:** it fully describes which measurement has been recorded.
- **Value:** it is the value recorded for that measurement. Since the measurements recorded here are mainly statuses or faults, this field often displays values such as "Yes/No", "Present/Absent", "Open/Close", etc. It may nevertheless contain information of another kind (an engine status, for example, can be stopped, running, cooling down, etc.).
- The toolbar (located at the bottom), contains the following buttons:
 - **Filter:** it allows selecting the period to be analysed and the recordings to be displayed.
 - **No filter:** it resets all the choices made using the "Filter" button.
 - **Update:** it allows refreshing the database grid (the grid is not automatically updated).
 - **Acknowledge:** it allows marking the recorded faults as "acknowledged".
 - **Print:** it allows producing a report in printable format with the grid values. It is then possible to print it or save it as a HTML or text file.
- The information panel (located at the top), that sums up the period to which the data refer and the number of recordings displayed. This panel also features a field ("Refresh every") to be used as an alternative to the "Update" button: it indicates (if different from zero) the interval at which SicesSupervisor must automatically update the database grid.

6.2.2.1.1 Selecting the Recordings to Be Displayed

By clicking on the "Filter" button on the toolbar, SicesSupervisor shows a window where it is possible to specify what should be displayed in the event grid.

Field	Filter
From	08/06/2009 0.00.00
To	09/06/2009 23.59.59
Resource	*
Alarm	*

If you want to set the filter, select a value from the list or type a text using the character '*' (at the beginning and/or at the end of the text) to indicate any numbers of any characters.

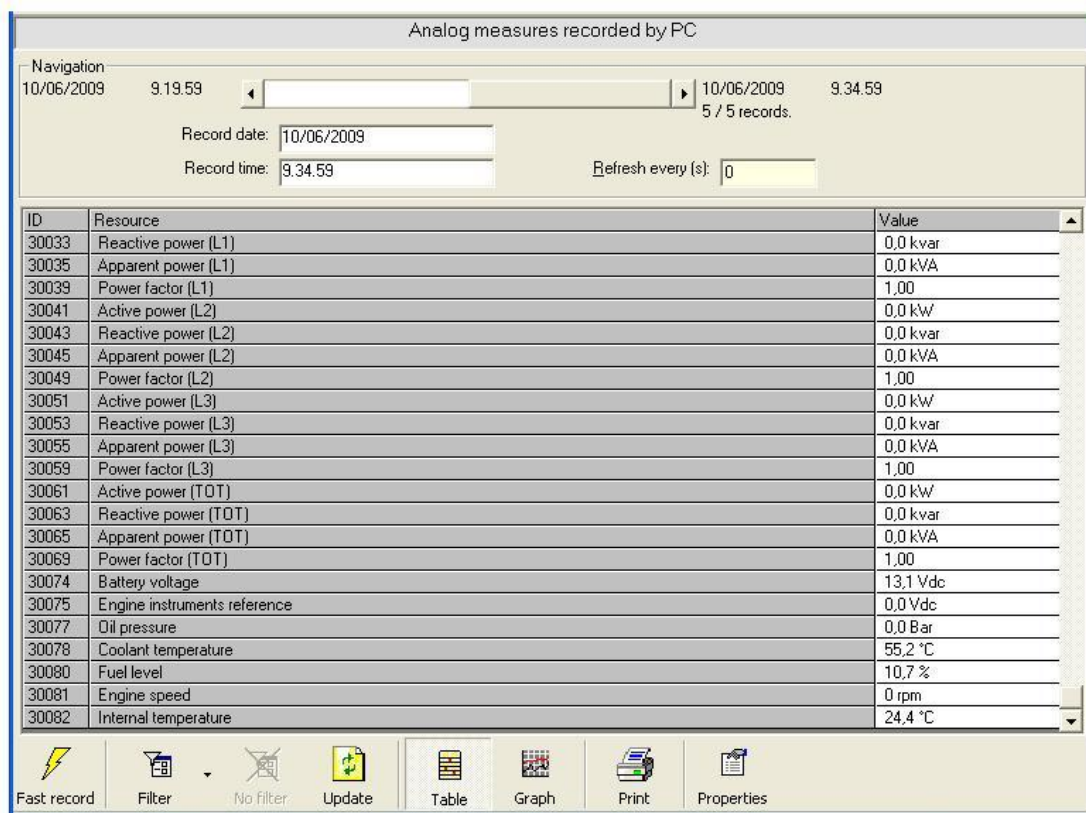
Clear filter Ok Cancel

0042_011_EN

It is possible to define what period you are interested in using the "start date" and "end date" fields (as default setting these fields show the whole current day). Moreover, you can also limit the recorded measurements to be displayed (by means of the "resource" field), by specifying the ID of the desired ones. Enter the "*" jolly character to select a group of IDs (example: enter "1000*" to display all the recordings having an ID from 10000 to 10009). Lastly, it is possible to force displaying only the non-acknowledged faults or the acknowledged ones, by means of the "Alarm" field. Click on "Delete filter" to go back to the default settings, as shown in the previous figure.

6.2.2.2 Periodical Recordings

Periodical recordings are automatic and need no action by the user. The following window can be used by the operator to display and analyse the recorded data (it can be used both with slow and fast interval recordings).

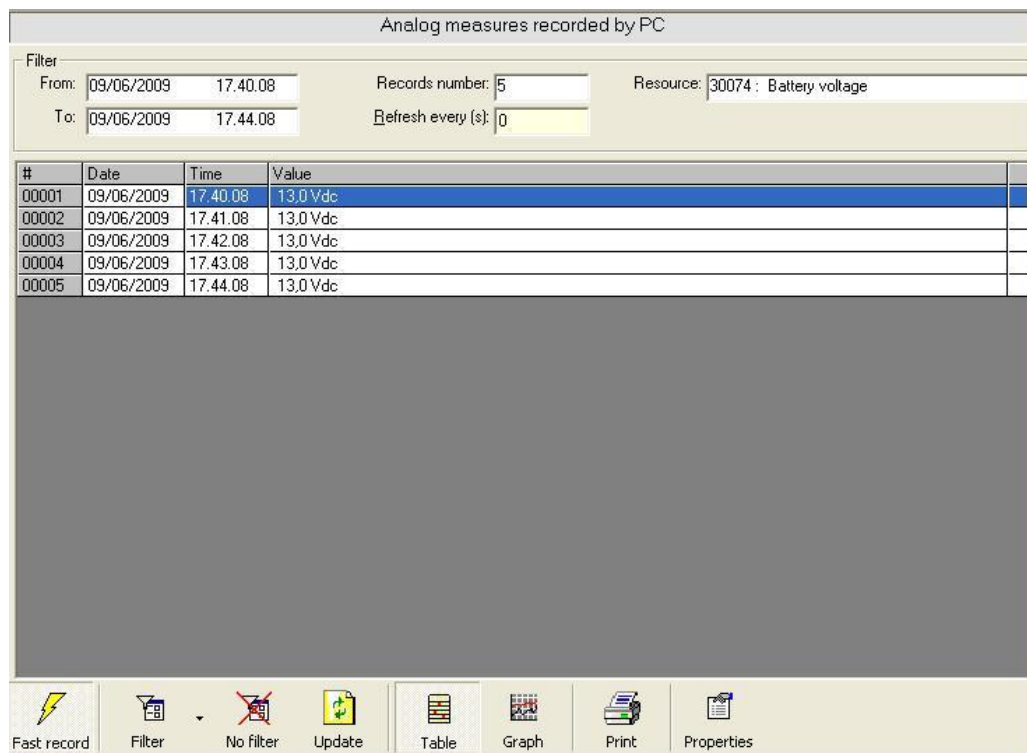


This figure shows the displaying format active when the operator wishes to read the recordings of two or more measurements at the same time. The displaying area is divided in three sections:

- Displaying grid: it shows all the measurements recorded in a certain moment (therefore it shows only one recording).
- Navigation area: it allows navigating between the recordings available in the selected period. It is composed of a scroll bar for navigation (at the ends of which are displayed time and date of the first and last recording within the selected period, and total number of recordings), and of two fields showing date and time of the recordings displayed in the grid. There is also an editable field that, if different from zero, indicates the interval after which SicesSupervisor should automatically update the grid.
- Toolbar (described below).

The grid consists of three columns:

- **ID**: it displays a numeric identifier associated with the displayed measurement. It can be used with the filter function.
- **Resource**: it shows the name of the recorded resource.
- **Value**: it shows the value (together with its unit of measurement) recorded for that measurement.



This window is used if the operator sets a filter to display only one of the recorded measurements. In this case, the window is still structured in three areas, but the roles are as follows:

- **Displaying grid:** it shows all the recordings of the measurement within the selected period (one recording per row). By using the vertical scroll bar located at the right of the grid it is possible to scroll through all the recordings.
- **Description area:** it shows a set of information related to what is currently displayed in the grid (date and time of the first and last recording, number of recordings and name and ID of the measurement to which the recordings refer). There is also an editable field that, if different from zero, indicates the interval after which SicesSupervisor should automatically update the grid.
- **Toolbar** (described below).

The grid consists of four columns:

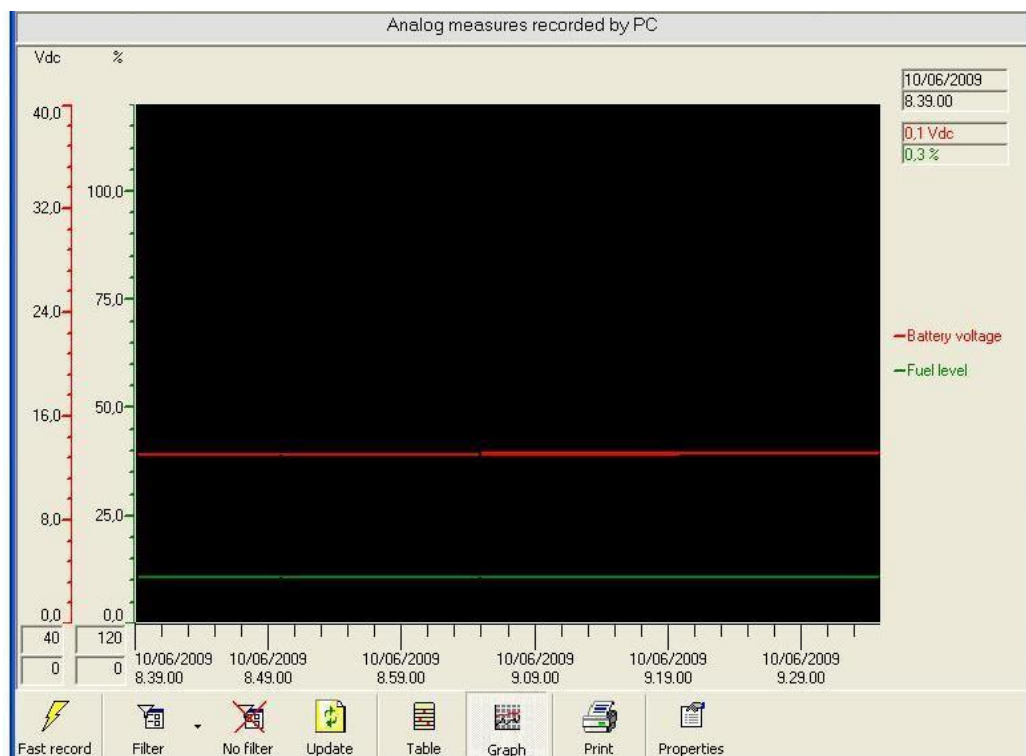
- **#:** it shows a progressive number associated with the recording.
- **Date:** date of the recording.
- **Time:** time of the recording.
- **Value:** recorded value (with unit of measurement).

As a default setting, SicesSupervisor displays all the measurements of all the recordings made on the current day. By using the filter controls, it is possible to select different time intervals and to display only specific categories of measurements (or even only a certain measurement).

The content of the grid is updated by SicesSupervisor when clicking on the "Analogue measures (PC)" button on the toolbar, or when changing the filter options. If new recordings are made when this window is displayed, it will not be automatically updated. For this purpose, the toolbar features a dedicated button.

The toolbar for displaying the history logs contains the following buttons.

- **“Fast recordings”**: it allows selecting whether to display the normal or fast recordings. It is a permanent button. If pressed, the grid displays the fast recordings, if released the grid displays the normal ones. This button is always enabled.
- **“Filter”**: it allows customising the display mode for the recordings. That is, it allows selecting a time interval (out which no recording is displayed) and a category of measurements (which may be reduced to only one measurement). This button is always enabled.
- **“No filter”**: it restores the predefined filter settings. As a default setting, all the measurements recorded in the current day are displayed. It is enabled only when customised filter settings are active.
- **“Update”**: it allows updating the grid from the database of the logs recorded by SicesSupervisor. This button is always enabled.
- **“Table”**: It allows selecting the table displaying mode for the recorded measurements (the one shown in the two previous figures). This button is always enabled.
- **“Graph”**: it allows selecting the graphic displaying mode for the recorded measurements (as explained further on). This button is always enabled.
- **“Print”**: it allows producing a report in printable format with the grid values. It is then possible to print it or save it as a HTML or text file.
- **“Properties”**: it allows customising the intervals for periodical recordings (both fast and slow) of the measurements. The values set are saved for each board separately.

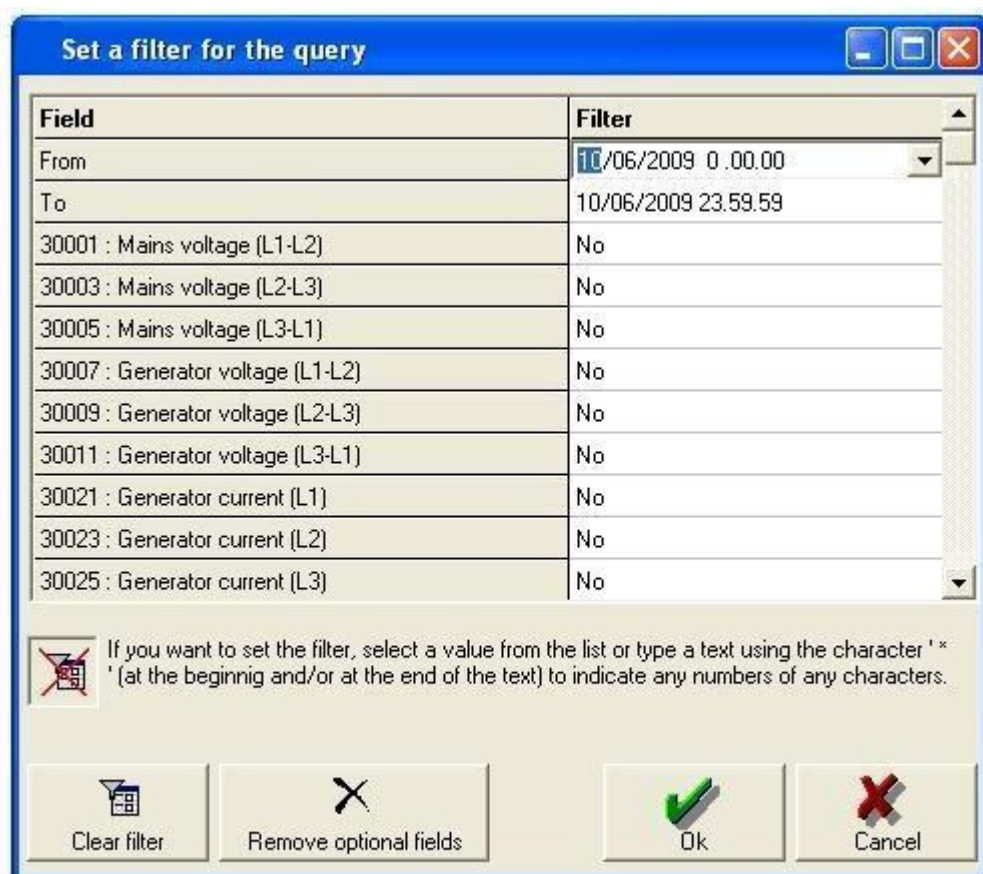


This window displays the recordings by means of a graph. What explained about the table displaying mode applies to this window too. The only difference is that the number of measurements is limited to six. The scales related to the unit of measurements of the recorded values are shown on the left side of the graph. If two or more values have the same unit of measurement, the scale is displayed once only. Generally, scales and measurements have the same colour (as per the "key to colours" on the right side of the graph): if a scale is associated with several measurements it appears in black. The scale upper and lower thresholds are set on the basis of default values. However, it is possible to modify them as needed (one scale at a time) by entering the desired value in the case located under each scale.

Beside the "key to colours", the right side of the graph also displays several cases that show the value of each measurement according to the position of the cursor (if you are rolling over the graph). This allows moving the cursor along the graph curve and automatically reading the value of the measurement in a specific point.

NB: the "print" button always produces a report under the table displaying mode, even if the window is currently in graph mode.

6.2.2.2.1 Selecting the Recordings to Be Displayed



0042_015_EN

There are four buttons in the lower part of the window:

- **"Clear filter"**: it has the same functions as the "No filter" button described in the previous paragraph.
- **"Remove optional fields"**: it stops displaying all the measures. It is useful in case you want only one measurement to be displayed: instead of deselecting each measurement, just click on this button and then select the desired one only.

- **“OK”**: it confirms any changes you made.
- **“Cancel”**: it maintains the filter settings unchanged.

The figure shows the filter settings applicable to the displaying of the periodical recordings.

- **“Start date”**: it allows setting the date and time to start displaying the recordings. The predefined value is current date at 00:00:00. Double-click on the value to modify it, then enter or select it by means of the easy-to-use calendar.
- **“End date”**: it allows setting the date and time to stop displaying the recordings. The predefined value is next day at 00:00:00. Double-click on the value to modify it, then enter or select it by means of the easy-to-use calendar.
- **“Measurements”**: the following rows show the name of one of the recorded measurements. The associated value may be yes/no and it specifies whether the measurements should be displayed or not in the grid. As a default setting, all the measurements are displayed. NB: the available measurements depend on the type of board.

6.2.3 Managing the Recordings Made by the Board in its History Log

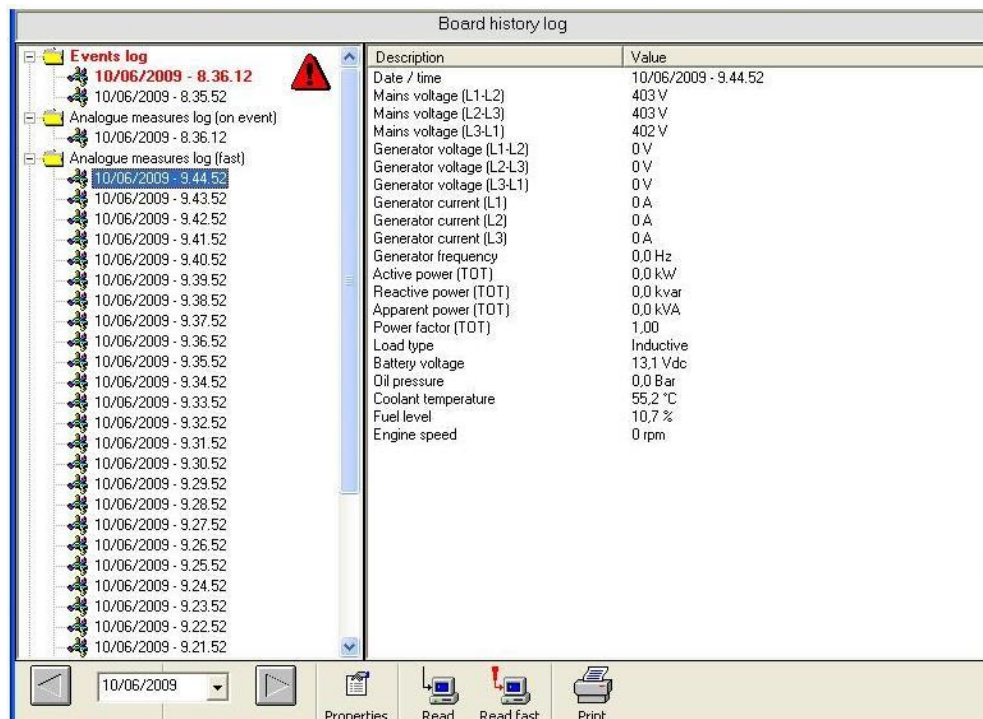
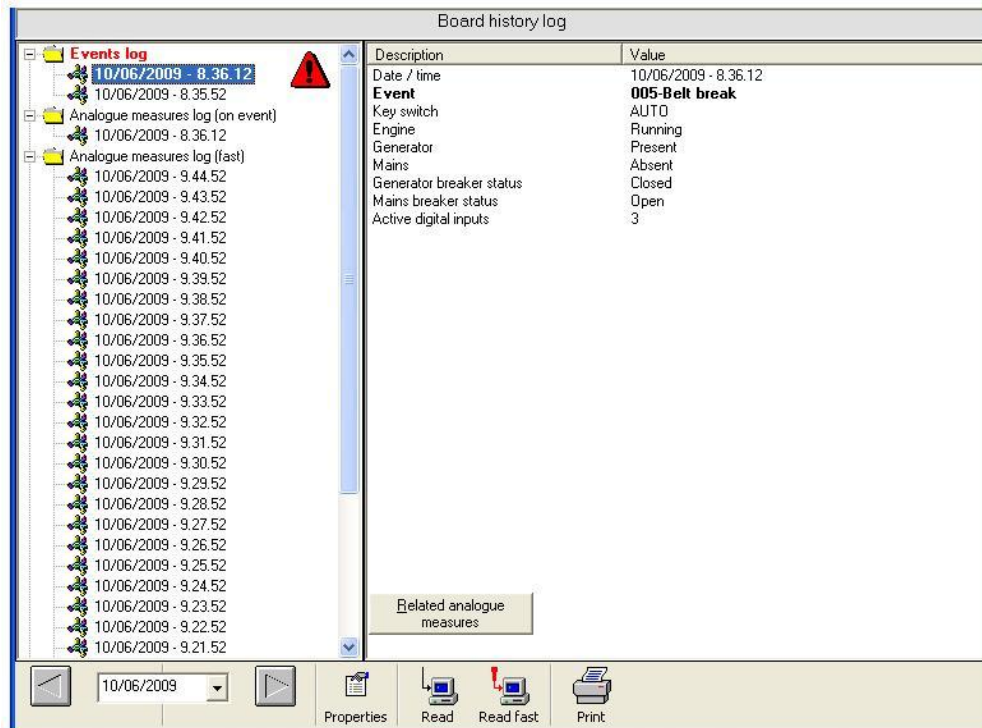
The DST4601 board records data in its internal memory. It carries out periodical recordings on the basis of two different time intervals, like SicesSupervisor does when connected (the recording interval may be programmed by means of the board parameters). It also carries out recordings upon status variations or faults (when a fault is detected, it also records all the significant measurements in an additional history log).

Therefore, the system manages four history logs:

- Events (recording upon variation).
- Significant measurements upon alarm and warning.
- Fast periodical recordings.
- Slow periodical recordings.

These recordings are stores in the internal non-volatile memory of the board (they are not lost when powering off the board). The memory can store up to 99 events, 15 measurement recordings upon faults, 30 fast periodical recordings and 48 slow periodical recordings. Using parameter P.441 it is possible to configure the events to be recorded; using parameter P.442 and P.443 it is possible to set the recording intervals (fast or slow).

The following figures show two views of the management window.



The four logs managed by the board are represented by the four folders displayed on the left side of the window. Each folder contains all the elements related to that log. By selecting an element, the right section of the window shows in detail what the recording of that element involves. The two figures above show what is displayed by selecting a recording upon variation or a periodical recording. If you select an element in the event log corresponding to an alarm or a warning, a button appears in the lower part of the window. Press it to display in detail the recording of the analogue measures carried out in that moment.

The window always shows the recordings related to the day selected in the toolbar. It is possible to move to the previous or next day by clicking on the two arrows. Otherwise, click on the day in order to display the calendar.

The board history logs are not automatically acquired, since the data transfer process would be quite long. For this purpose two buttons are provided on the toolbar ("Read" and "Read fast"). The first button ("Read") starts a full acquisition of the history logs from the board memory. The second button starts reading only those recordings not previously acquired by the PC. It is also possible to set a maximum number of recordings to be read. Once it has been acquired, the board history log is saved in one or more databases.

Using the "Properties" button it is possible to set the maximum number of recordings to be read for each log when using the "Read fast" button. By entering "-1" no limit is set. By entering 0 no data will be acquired from that log. **NB: these settings are also used when the log is automatically acquired following an alarm call from the boards to the PC.**

Lastly, there is a "Print" button that produces a report of the recordings related to the selected day. It can be printed or exported as HTML or text file.

If the remote fault message function is enabled, when the PC receives a request through a communication device it automatically connects to the plant and acquires its log, since it also reports the detected fault.

7. Boards Managing the Generator Sets

7.1 DST4600

This board only manages the DST4600 protocol. It has a fixed serial address equal to zero and uses the serial port at 2,400 bauds, one start bit, one stop bit and no parity bit. It does not allow for configuration. These information should be kept in mind when configuring the plant. Moreover, this board does not have any internal logs, it does not support GSM modems and cannot route calls to a PC in case of faults. Since it supports only the DST4600 protocol it cannot be connected via Ethernet network, as the latter requires the ModBus protocol.

7.1.1 Configuring the Board



0042_018_EN

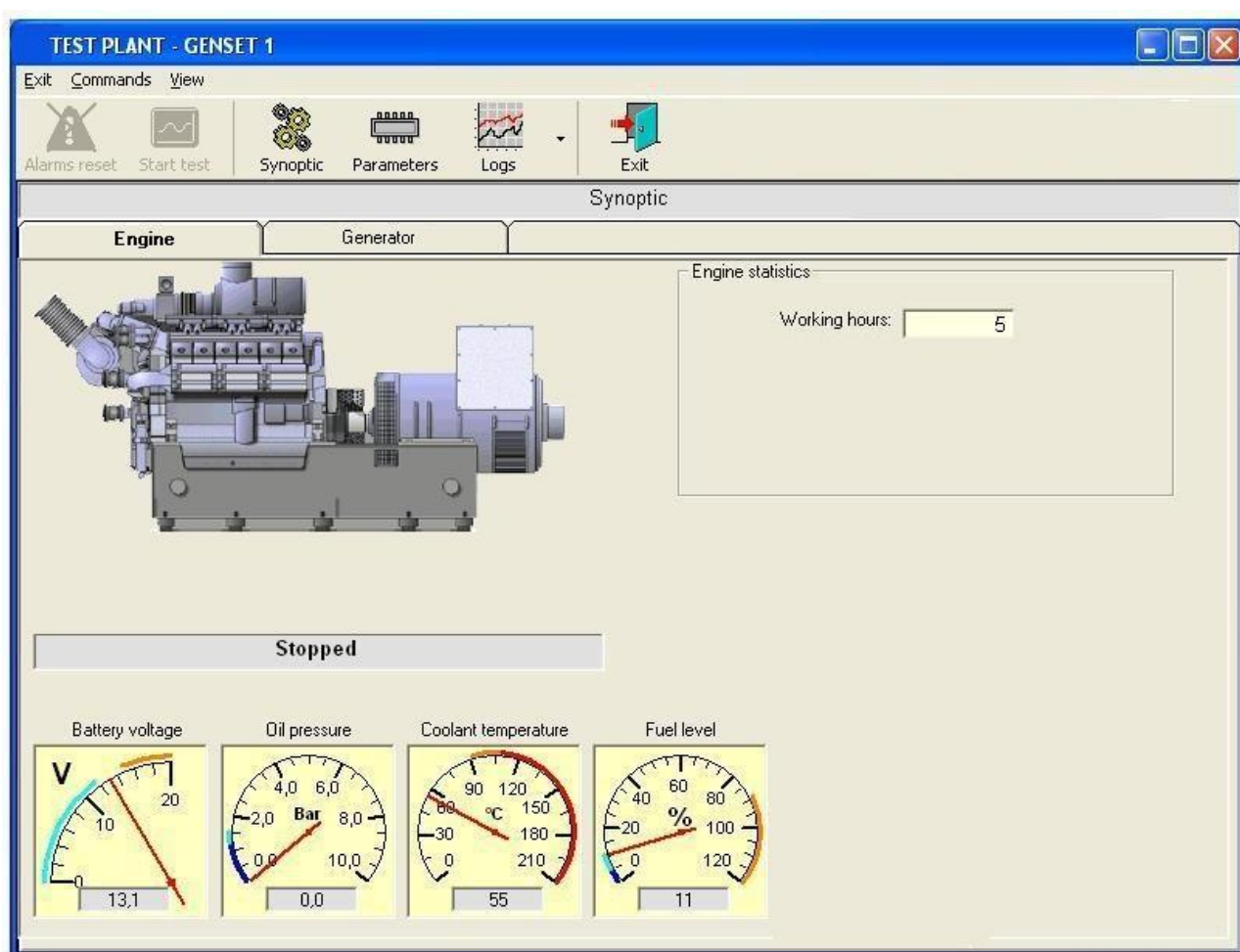
No special configuration is needed. The software version is not important, since SicesSupervisor manages it automatically. The only option that may be configured is the option between standard version and /P version. It is used in the program only to display the correct board type in the "unifilar" window.

7.1.2 Information Displayed in the "Unifilar" Window

The following information are displayed:

- Voltage, current and frequency of the generator (the single-phase/three-phase configuration is taken from the plant configuration, it cannot be acquired from the board).
- The engine status and working hours.
- The status of the generator.
- The status of the key switch.
- The battery voltage and, if configured on the board, the instruments for oil pressure, coolant temperature and fuel level.
- Any faults.

7.1.3 Detailed Window



0042_019_EN

The figure shows the supervision window that allows for detailed analysis of a DST4600 board. When displayed, the title bar shows the name associated with the board. In the example shown in the figure, the displaying area is used to show the engine status and that of the engine instruments. Each pointer instrument also shows the warning and alarm thresholds for these measurements.

By clicking on the "Generator" tab, the window displays the voltage, current and frequency values of the generator in a graphic format (using pointer indicators). Each pointer instrument also shows the warning and alarm thresholds for the corresponding measurement.

The menu bar and the toolbar feature the same controls:

- **Exit:** closes the window.
- **View - Synoptic:** it allows displaying the board general supervision pages (see previous figure). This function is always displayed and enabled. No access level is set for this control.
- **View - Parameters:** it allows displaying and modifying the board programming parameters (see 6.2.1). On this board, the parameters do not have protection codes and the serial port is not protected by a password. The corresponding fields are then visible. This function is always displayed and enabled. No access level is set for this control.
- **View - Logs:** it is an uncommon menu. It only allows accessing a sub-menu where to select the type of history log to be displayed. This sub-menu features the following items:
 - **Events (PC):** it shows the general window (see 6.2.2.1) to manage the data recorded "upon variation" by the PC. This function is always displayed and enabled. No access level is set for this control. The stored events are:
 - Mains and gen-set contactor status (opening and closing).
 - Generator status (when present and when absent).
 - Mains status (when present and when absent).
 - Engine status (any changes between shut-off, start-up, running, cooling down, stopping).
 - Key switch position (any changes).
 - Alarms and warnings (only upon activation).
 - **Analogue measures (PC):** it shows the general window (see 6.2.2.2) to manage the data periodically recorded by the PC. This function is always displayed and enabled. No access level is set for this control. The measurements stored are:
 - Mains voltage.
 - The voltage, current and frequency values of the generator.
 - The start-up battery voltage.
 - The engine instruments (oil pressure, coolant temperature, fuel level).
- **Commands – Alarm reset:** it allows sending a command to the board to accept or clear all the stored faults. It carries out the same operation as when turning the board key switch to the OFF/RESET position and then back to its original position. This menu option is enabled only if at least one fault is stored in the board. If no fault is present, the option will be visible but not enabled. SicesSupervisor will request a control password if the user does not have the right access level.

- **Commands – Engine test:** it allows sending a command to the board to start the engine for a test. It is visible only when the engine has not been already started for test. It is enabled if the board key switch is in the AUTO position and the engine is stopped (and therefore, the mains or the inhibition input is present). SicesSupervisor will request a control password if the user does not have the right access level. In case the communication with the board is interrupted after the engine has been started for test, the board will automatically shut down the engine after 60 seconds.
- **Commands – Stop test:** it allows interrupting the engine test. It is visible only when the engine has been started for test. SicesSupervisor will request a control password if the user does not have the right access level.

7.2 DST4600A

This board manages both the DST4600 protocol and the ModBus RTU protocol (configurable by means of parameter P.51). Its serial address is configurable by means of parameter P37, while its communication characteristics (baud rate, etc.) are configurable by means of parameters P.62 and P.63. These information should be kept in mind when configuring the plant. Moreover, this board has an internal log, can be equipped with an hardware clock and is able to carry out power measurements. It also supports GSM modems and can route calls to a PC in case of faults. It is compatible with the Ethernet network.

7.2.1 Configuring the Board

No special configuration is needed. Even if it is not compulsory, it may be useful to configure the major and minor releases of the board software, in addition to the standard or /P version. The reference for the major and minor release can be found on the back of the board, under the message:

- SW 08xxyy for the standard version
- SW 12xxyy for the /P version
- SW 29xxyy for the asynchronous engine version

The xx number corresponds to the major release, the yy number to the minor release. These settings are not compulsory since SicesSupervisor automatically acquires these information and carries out the configuration (upon the operator's authorization) when connecting to the board for the first time.

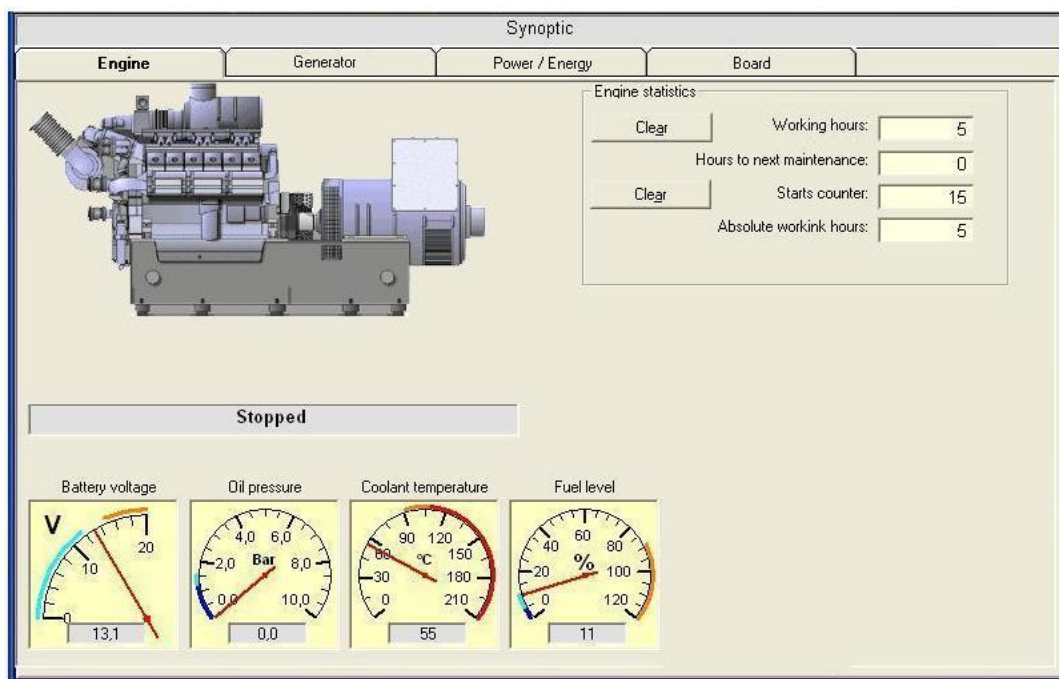
7.2.2 Information Displayed in the "Unifilar" Window

The following information are displayed:

- The voltage, current and frequency values of the generator (the single-phase / three-phase configuration is acquired from the board).
- The engine status with start-up counter, working hours partial counter and absolute counter.
- The status of the generator.
- The status of the key switch.
- The presence of the inhibition input (displayed by means of a lock pad over the engine).
- The power measurements (active, reactive, apparent, power factor, load type) if enabled on the board (the power measurement is an option).

- The battery voltage and, if configured on the board, the instruments for oil pressure, coolant temperature and fuel level.
- Any faults.
-

7.2.3 Detailed Window



The figure shows the supervision window allowing for detailed analysis of a DST4600A board. When displayed, the title bar shows the name associated with the board. In the example shown in the figure, the displaying area is used to show the engine status and that of the engine instruments. Four pages are available:

- **Engine:** in addition to the engine status, it also shows (by means of pointer instruments) the battery voltage, oil pressure, coolant temperature and fuel level, if enabled in the board programming parameters. Each pointer instrument also shows the warning and alarm thresholds for these measurements. If a fault related to an instrument is detected, a flashing icon is displayed (yellow for warnings and red for alarms). Also the engine counters are displayed, together with their reset buttons (**NB: using the DST4600 protocol it is not possible to reset the counters, and only the working hour partial counter is displayed**).
- **Generator:** it displays the voltage, current and frequency values of the generator in a graphic format (by means of pointer indicators). Each pointer instrument also shows the warning and alarm thresholds for these measurements. For single-phase systems, the inapplicable phases are not shown. If a fault related to an instrument is detected, a flashing icon is displayed (yellow for warnings and red for alarms).
- **Power / Energy:** it shows, in graphic form, the vectorial trend of voltage, power and current values of the generator. It also displays the same information in a table format, together with the energy counter and its reset button. Two graphs are displayed: the first one shows the vectorial trend of currents with respect to their corresponding voltages (and also the phase rotation direction); the second one shows the phase and total power disposition in the four frames, by highlighting the type of load (inductive/capacitive) connected to each phase and total. (**NB: using the DST4600 protocol, the power measurements on the single phases cannot be acquired, this page is therefore disabled**).

- **Board:** it shows some information related to the board, such as the software code, the input and output status and, if the board is equipped with a clock, the time set on the board, with the possibility of synchronizing it with the PC clock. **(NB: using the DST4600 protocol it is not possible to acquire any clock data, therefore the clock is not displayed).**

The menu bar and the toolbar feature the same controls:

- **Exit:** closes the window.
- **View - Synoptic:** it allows displaying the board general supervision pages (see previous figure). This function is always displayed and enabled. No access level is set for this control.
- **View - Parameters:** it allows displaying and modifying the board programming parameters (see 6.2.1). On this board, the parameters do not have protection codes but the serial port is protected by a password. Therefore, the fields related to parameter protection will be invisible. Two parameter menus can be used: the first one contains all the programmable parameters of the board (their number varies according to the software release); the second one allows setting the remote fault message mode (via modem or Ethernet). This function is always displayed and enabled. No access level is set for this control.
- **View - Logs:** it is an uncommon menu. It only allows accessing a sub-menu where to select the type of history log to be displayed. This sub-menu features these three items:
 - **Events (PC):** it shows the general window (see 6.2.2.1) to manage the data recorded "upon variation" by the PC. This function is always displayed and enabled. No access level is set for this control. The stored events are:
 - Mains and gen-set contactor status (opening and closing).
 - Generator status (when present and when absent).
 - Mains status (when present/absent and when out of range).
 - Engine status (any change between shut-off, start-up, running, cooling down, stopping).
 - Key switch position (any changes).
 - Alarms and warnings (only upon activation).
 - **Analogue measures (PC):** it shows the general window (see 6.2.2.2) to manage the data periodically recorded by the PC. This function is always displayed and enabled. No access level is set for this control.
 - Mains voltage.
 - The voltage, current and frequency values of the generator.
 - The start-up battery voltage.
 - The engine instruments (oil pressure, coolant temperature, fuel level).
 - The total powers of the system (active, reactive, apparent, power factor).
 - **Board history log:** it shows the window where to read and manage the log data recorded by the board on its internal memory.
- **Commands – Alarm reset:** it allows sending a command to the board to accept or clear all the stored faults. It carries out the same operation as when turning the board key switch to the OFF/RESET position and then back to its original position. This menu option is enabled only if at least one fault is stored in the board. If no fault is present,

the option will be visible but not enabled. SicesSupervisor will request a control password if the user does not have the right access level.

- **Commands - Stop engine:** it allows sending a command to the board to stop the engine. It has the same function as the STOP button on the board. This menu item is always visible and enabled. SicesSupervisor will request a control password if the user does not have the right access level. **(NB: this is not available with the DST4600 protocol).**
- **Commands – Engine test:** it allows sending a command to the board to start the engine for a test. It is visible only when the engine has not been already started for test. It is enabled if the board key switch is in the AUTO position and the engine is stopped (and therefore, the mains or the inhibition input is present). SicesSupervisor will request a control password if the user does not have the right access level. In case the communication with the board is interrupted after the engine has been started for test, the board will automatically shut down the engine after 60 seconds.
- **Commands – Stop test:** it allows interrupting the engine test. It is visible only when the engine has been started for test. SicesSupervisor will request a control password if the user does not have the right access level.
- **Commands – Lock:** it allows sending a command to inhibit the board operation. The board then reacts by activating the F12 alarm. This alarm cannot be deactivated (not even by powering off the board) unless by sending the command to remove the lock. It is visible only if the board is not in the lock mode yet. It is enabled only if the operator has an admin access level.
- **Commands – Unlock:** it allows sending a command to the board to deactivate the lock mode. The board reacts to this command by automatically resetting and deactivating the F12 alarm. It is visible only if the board is in the lock mode. It is enabled only if the operator has an admin access level.

7.2.4 Managing the Recordings Made by the Board in its History Log

The DST4600A board, starting from software release 00.18, carries out recordings in its internal memory. These logs can be read using the DST4600 protocol and, starting from release 00.23, also the ModBus protocol. It carries out periodical recordings on the basis of two different time intervals, like SicesSupervisor does when connected (the recording interval may be programmed by means of the board parameters). It also carries out recordings upon status variations or faults (when a fault is detected, it also records all the significant measurements in an additional history log).

Therefore, the system manages four history logs:

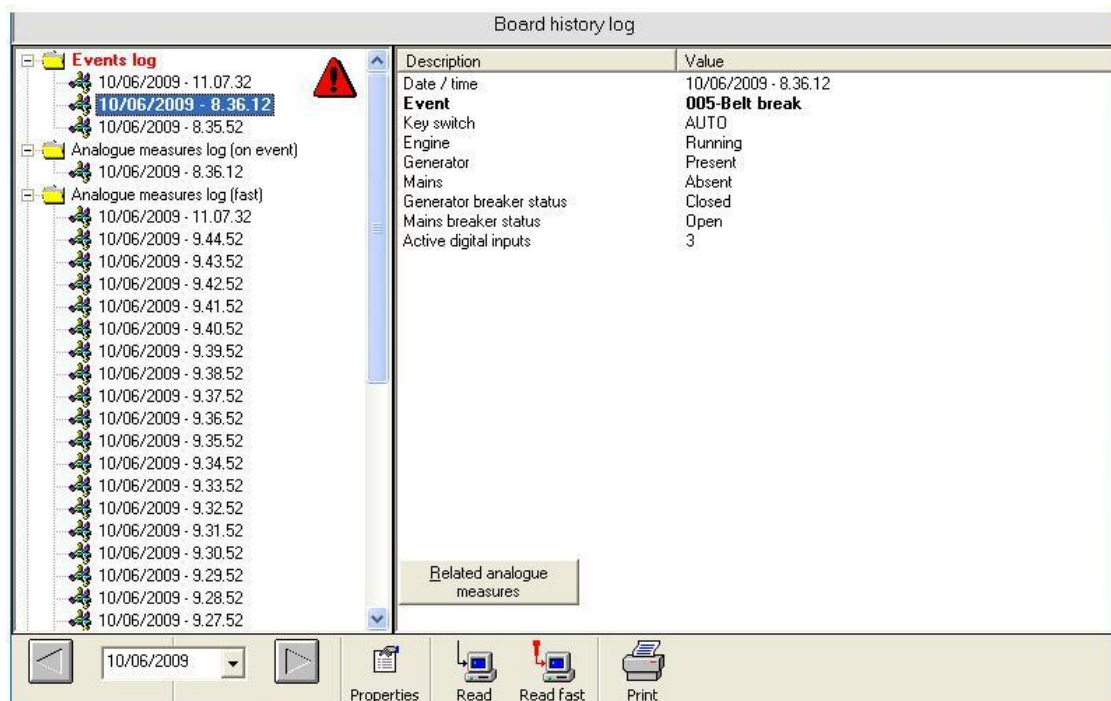
- Events (recording upon variation).
- Significant measurements upon alarm and warning.
- Fast periodical recordings.
- Slow periodical recordings.

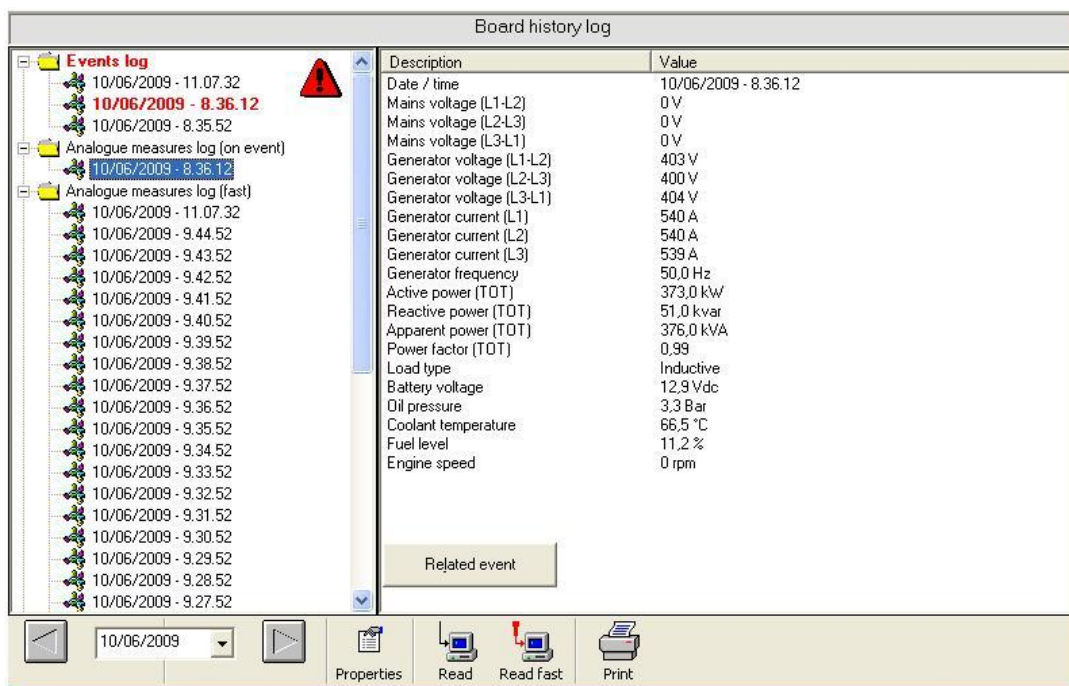
These recordings are stored in the board internal memory. The memory type and capacity depends on the presence of the hardware clock option:

- If the clock option is present, the history logs are stored in a non-volatile form (they are not lost when powering off the board). The memory can store up to 96 events, 16 measurement recordings upon faults, 30 fast periodical recordings and 48 slow periodical recordings. The following events are recorded:
 - Board power supply.
 - Clock update.

- Alarms and warnings.
 - Key position variations.
 - Mains, generator and lock contact status variation.
 - Changeover status variations.
 - Engine status variations.
 - Stop/start-up controls.
 - Fuel pump status variations.
- If the clock option is not present, the history logs are stored in a **volatile** form (they are **lost** every time the board is powered off). The memory can store up to 15 events, 15 measurement recordings upon faults, 30 fast periodical recordings and 48 slow periodical recordings. The following events are recorded:
 - Alarms and warnings.
 - Mains presence or absence (only upon configuration)

The following figures show two views of the management window.





The four logs managed by the board are represented by the four folders displayed on the left side of the window. Each folder contains all the elements related to that log. By selecting an element, the right part of the window will show in detail what is recorded in that element. The two previous figures show what is displayed by selecting a recording upon variation and a periodical recording. If you select an element in the event log corresponding to an alarm or a warning, a button appears in the lower part of the window. Press it to display in detail the recording of the significant measurements carried out in that moment.

The window always shows the recordings related to the day selected in the toolbar. It is possible to move to the previous or next day by clicking on the two arrows. Otherwise, click on the day in order to display the calendar.

The board history logs are not automatically acquired, since the data transfer process would be quite long. For this purpose two buttons are provided on the toolbar ("Read" and "Read fast"). The first button ("Read") starts a full acquisition of the history logs from the board memory. The second button starts reading only those recordings not previously acquired by the PC. It is also possible to set a maximum number of recordings to be read. Once it has been acquired, the board history log is saved in one or more databases.

Using the "Properties" button it is possible to set the maximum number of recordings to be read for each log when using the "Read fast" button. By entering "-1" no limit is set. By entering 0 no data will be acquired from that log. **NB: these settings are also used when the log is automatically acquired following an alarm call from the boards to the PC.**

Lastly, there is a "Print" button that produces a report of the recordings related to the selected day. It can be printed or exported as HTML or text file.

If the remote fault message function is enabled, when the PC receives a request through a communication device it automatically connects to the plant and acquires its log, since it also reports the detected fault.

7.2.5 Configuring the Remote Fault Messages

Programmable parameters				
General Comunicazione				
ID	Description	U.M.	value	New value
C.01	Dial mode			
C.02	Number of rings before answering			
C.03	SMS and data call enables for warnings			
C.04	SMS and data call enables for alarms			
C.05	Plant name			
C.06	First phone number			
C.07	Second phone number			
C.08	Third phone number			
C.09	Forth phone number			
C.10	Fifth phone number			
C.11	Sixth phone number			
C.21	SMS or data call selection (numbers 1..4)			
C.22	Number of SMS or data call try (numbers 1..4)			
C.23	SMS or data call selection (numbers 5,6)			
C.24	Number of SMS or data call try (numbers 5,6)			

Change
Copy
Transmit
Load
Save
Print

This figure shows in detail how to set the board communication options. To display it, click on "View - Parameters" from the detailed window, then click on the "Communication" folder. Not all the parameters listed in the figure are always present: it depends on the software release. Here is a short description:

- C.01: used **only** if an analogue modem is connected to the board. It communicates to the board whether the phone line connected to the modem uses a pulse (decadic) or tone (multi-frequency) dialling mode.
- C.02: used **only** if an analogue or GSM modem is connected to the board. It allows delaying the answer of the board to the phone calls according to the number of rings set. Leave it set to 1 if it is not relevant to you.
- C.03: used both when the board is connected via modem and via Ethernet. It enables the remote communication of the warnings (the board will send a call or an SMS upon any new warning).
- C.04: used both when the board is connected via modem and via Ethernet. It enables the remote communication of the alarms (the board will send a call or an SMS upon any new alarm).
- C.05: used **only** if an analogue or GSM modem is connected to the board. It allows associating a string to the board. This string will be added to every SMS sent and will be used by the PC receiving a phone call to identify it. **NB: if you configure the board to route calls to a PC, this string must correspond to the name associated with the plant in the PC, and not to the name associated with the board.**
- C.06-C.09: used **only** if an analogue or GSM modem is connected to the board. These are four telephone numbers (collectively called first group) that can be used to configure the recipient for the SMS or data calls.
- C.10-C.11: used **only** if an analogue or GSM modem is connected to the board. They are available only on boards having a software release 00.39 or higher. These are two telephone numbers (collectively called second group) that can be used to configure the recipient for the SMS or data calls.

- C.21: used **only** if an analogue or GSM modem is connected to the board. It allows configuring what should be sent to the numbers of the first group: SMS or data calls. **NB: this selection applies to all the numbers of the first group.**
- C.22: used **only** if an analogue or GSM modem is connected to the board. It allows specifying how many SMS should be sent to each number of the first group in case of new alarms or warnings. If the numbers of the first group are configured for calls to PCs, it allows setting the number of call retries the board should make for each number if the line is engaged or if it is not possible to establish a connection.
- C.23: used **only** if an analogue or GSM modem is connected to the board. It allows configuring what should be sent to the numbers of the second group: SMS or data calls. **NB: this selection applies to all the numbers of the second group.** This is available only on boards having a software release 00.39 or higher.
- C.22: used **only** if an analogue or GSM modem is connected to the board. It allows specifying how many SMS should be sent to each number of the second group in case of new alarms or warnings. If the numbers of the second group are configured for calls to PCs, it allows setting the number of retries the board should make for each number if the line is engaged or if it is not possible to establish a connection. This is available only on boards having a software release 00.39 or higher.

When activating the remote fault message function, the operations vary according to the connection type: analogue modem, GSM or Ethernet.

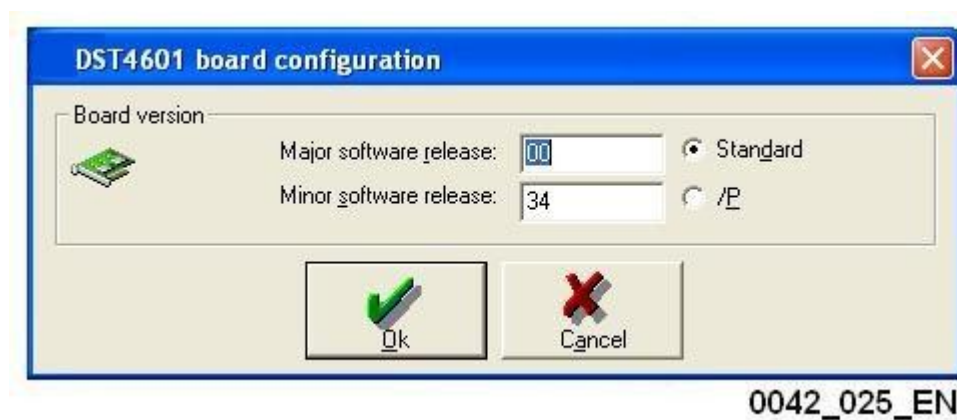
- Ethernet: in this case, you only have to configure when the board should send a remote message. For this purpose, use fields C.03 e C.04 described above to enable communication upon activation of warnings and alarms respectively. It is also possible to enable the communication in case of failure and restoring of the electric mains, by using bit no. 6 of parameter P.61 and bit no. 3 of parameter P.79 (see the operation manual of the board).
- For GSM modems, you need to decide whether the communication should be made via SMS or by calling a PC that will acquire and store the faults. Starting from release 00.39, it is possible to use both options at the same time by using both telephone number groups and by assigning each group to a different function. If the modem is an analogue one, then the only possible choice is a call to PCs and therefore both number groups should be configured in this way (see fields C.21 and C.23 described above). If at least one of the two groups is configured to make calls to PCs, you should also remember to activate bit no. 2 of board parameter P.61. Then enter the numbers to call: for each group it is possible to use all or only some of the numbers. Then, you need to specify in each group how many SMS per event should be sent to each number (typically 1) or how many call retries should be made to each PC (see the call sequence in the operation manual of the board). In field C.05, you also need to specify the plant name as configured in the PCs. Lastly, you need to choose when the board should send the remote message: the same instructions for the Ethernet connection apply.

7.3 DST4601 and DST4400

These boards control the complete management of a gen-set and support the ModBus RTU communication protocol. They have a serial address which can be configured by means of parameter P.452, while the communication characteristics (baud rate, etc.) can be configured by means of parameters P.453 and P.454. These information should be kept in mind when configuring the plant. Moreover, these boards have an internal log and hardware clock and are able to carry out power measurements. They also support GSM modems and can route calls to a PC in case of faults. They are compatible with the Ethernet network or Gateway board.

The DST4601 board configuration and operation is described below. The DST4400 board operates similarly.

7.3.1 Configuring the Board

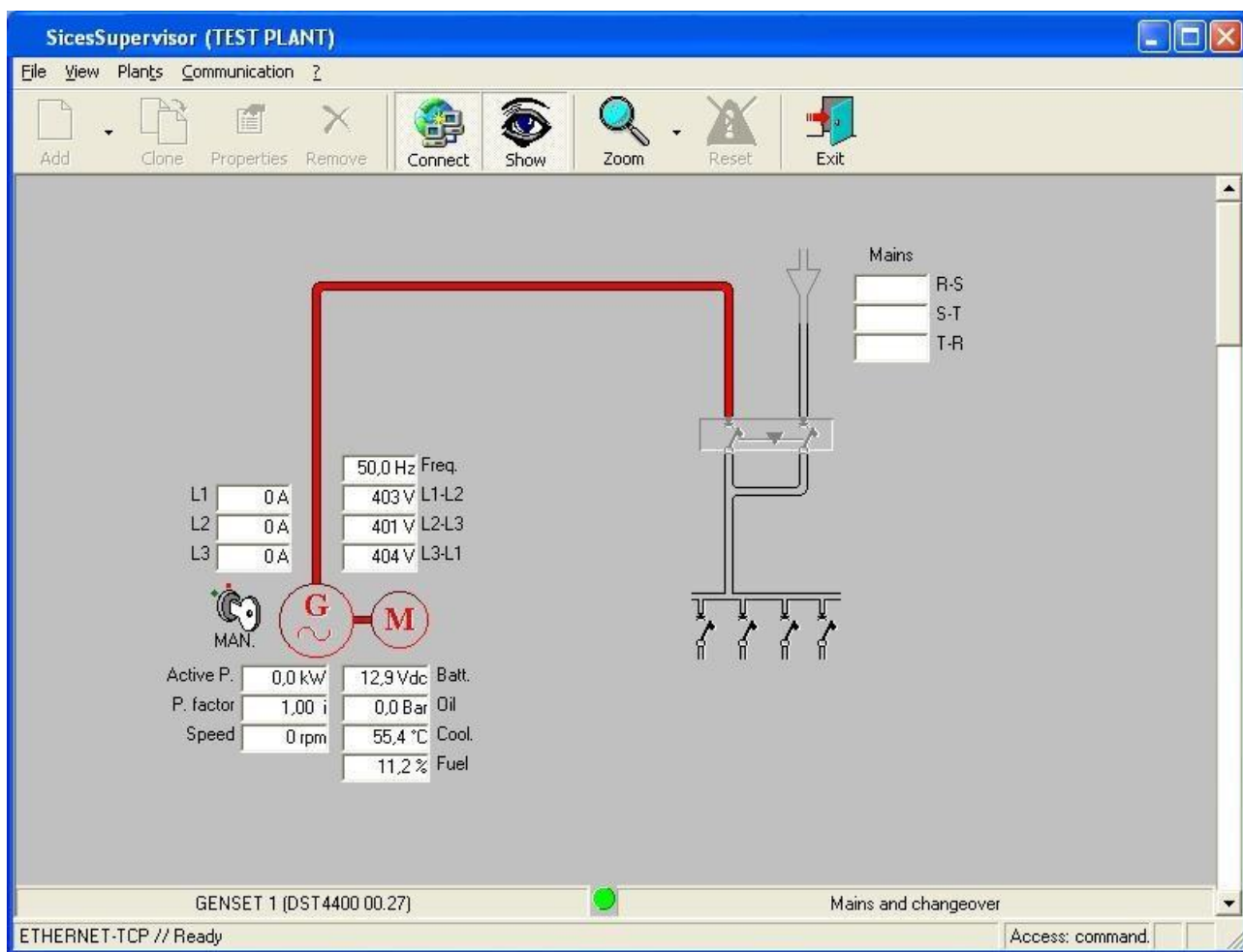


No special configuration is needed. Even if it is not compulsory, it may be useful to configure the major and minor releases of the board software, in addition to the standard or /P version. The reference for the major and minor release can be found on the back of the board, under the message:

- SW 40xxyy for the standard version
- SW 57xxyy for the /P version

The xx number corresponds to the major release, the yy number to the minor release. These settings are not compulsory since SicesSupervisor automatically acquires these information and carries out the configuration (upon the operator's authorization) when connecting to the board for the first time.

7.3.2 Information Displayed in the "Unifilar" Window



0042_026_EN

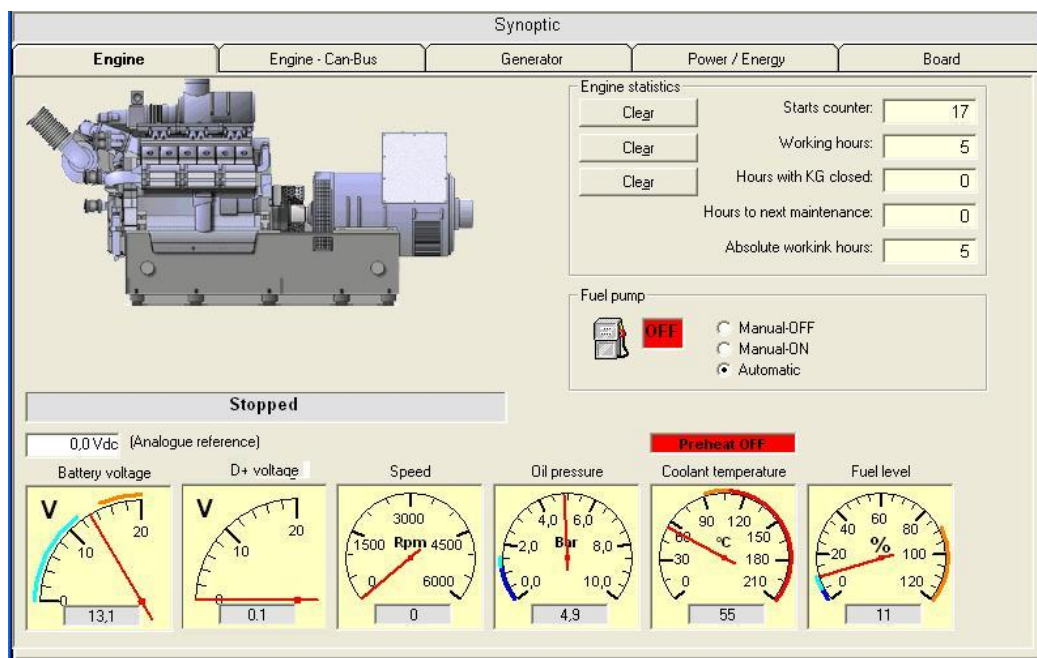
The following information are displayed:

- The voltage, current and frequency values of the generator (the single-phase / three-phase configuration is acquired from the board).
- The engine status with start-up counter, working hours partial counter and absolute counter. These parameters can be displayed in the yellow tooltip window, by positioning over the engine symbol (rounded M).
- The status of the generator.
- The status of the key switch.
- The power measurements (active, reactive, apparent, power factor, load type, active and reactive energy counters). They can be displayed as tooltips by positioning the cursor over the "Active P." field.
- The battery voltage and, if configured on the board, the instruments for oil pressure, coolant temperature and fuel level.
- The engine rpm (if configured on the board).
- The voltage of the battery charger alternator (if configured on the board).
- Any faults.

7.3.3 Detailed Window

The figure shows the supervision window that allows for detailed analysis of a DST4601 board. When displayed, the title bar shows the name associated with the board. In the example shown in the figure, the displaying area is used to show the engine status and that of the engine instruments. Five synoptic pages are available:

- **Engine:**



in addition to the engine status, it displays (by means of pointer instruments) the battery voltage and, if enabled by means of the programming parameters, the values for oil pressure, coolant temperature, fuel level, rpm (speed) and voltage of the battery charger alternator (D+ voltage). Each pointer instrument also shows the warning and alarm thresholds for these measurements. It also shows the voltage measured on the "ANALOG.REF" input, that indicates the voltage difference between the start-up battery negative pole and the engine frame.

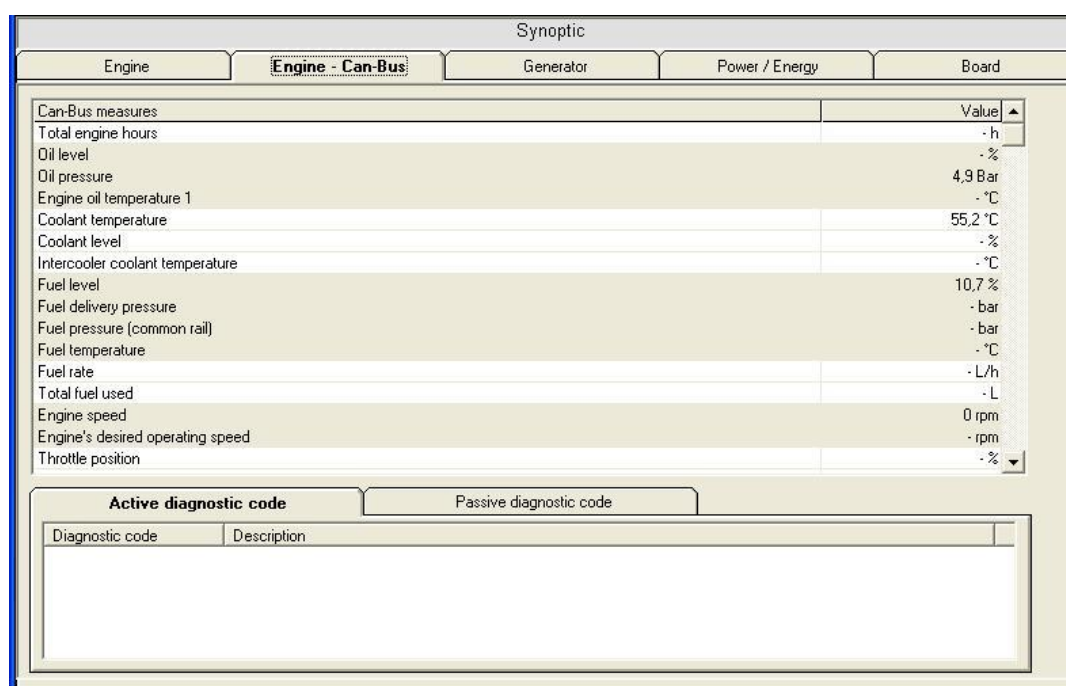
If a fault related to an instrument is detected, a flashing icon is displayed (yellow for warnings and red for alarms).

Also the engine counters are displayed, together with their reset buttons (they also include the hour-to-maintenance counter, whose value decreases instead of increasing).

If the board is configured to manage the coolant pre-heating, a status window is displayed ("Pre-heat off" on red background, or "Pre-heat On" on green background).

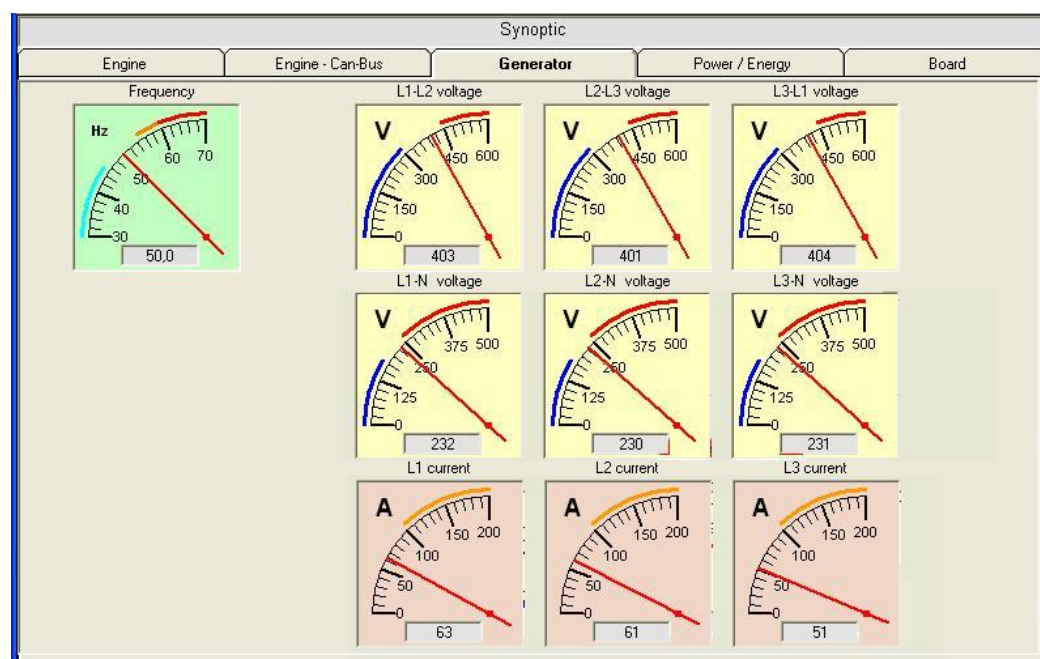
For automatic control of a fuel pump by the board, the fuel pump assembly appears in a frame that allows for displaying its status and controlling its operation. For the operation instructions see the DST4601 board operation manual.

- **Engine - Can-Bus:**



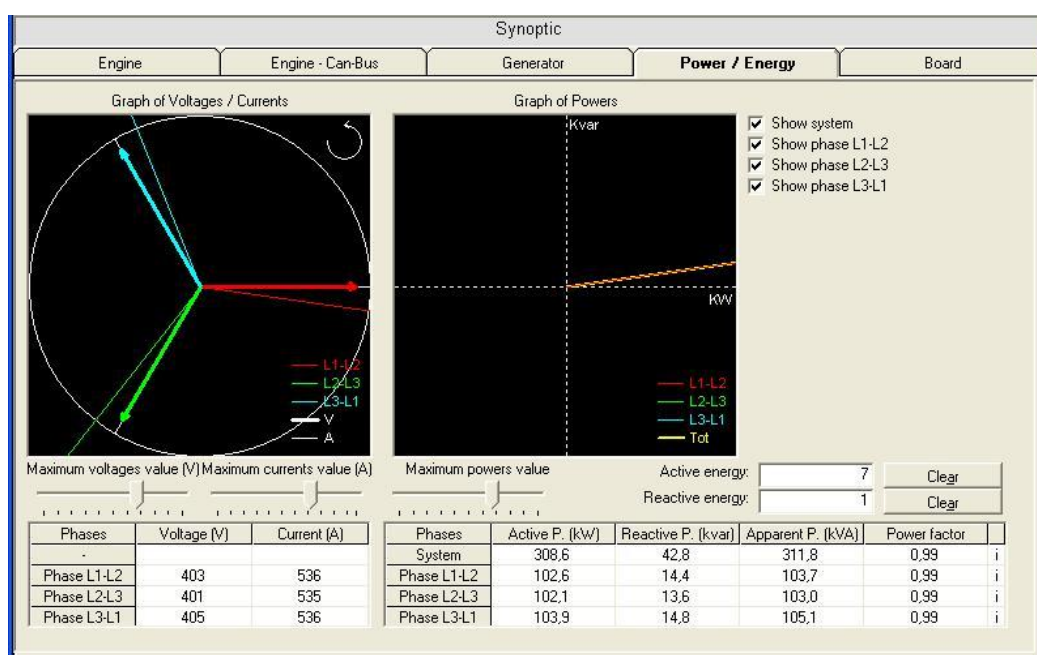
It displays the main information acquired from the engine via Can-Bus. For MTU engines, a MTU button (in the lower part of the window) is provided to allow accessing all the secondary information acquired from the engine. The lower part of the window shows all the engine diagnostic codes, both currently active and stored.

- **Generator:**



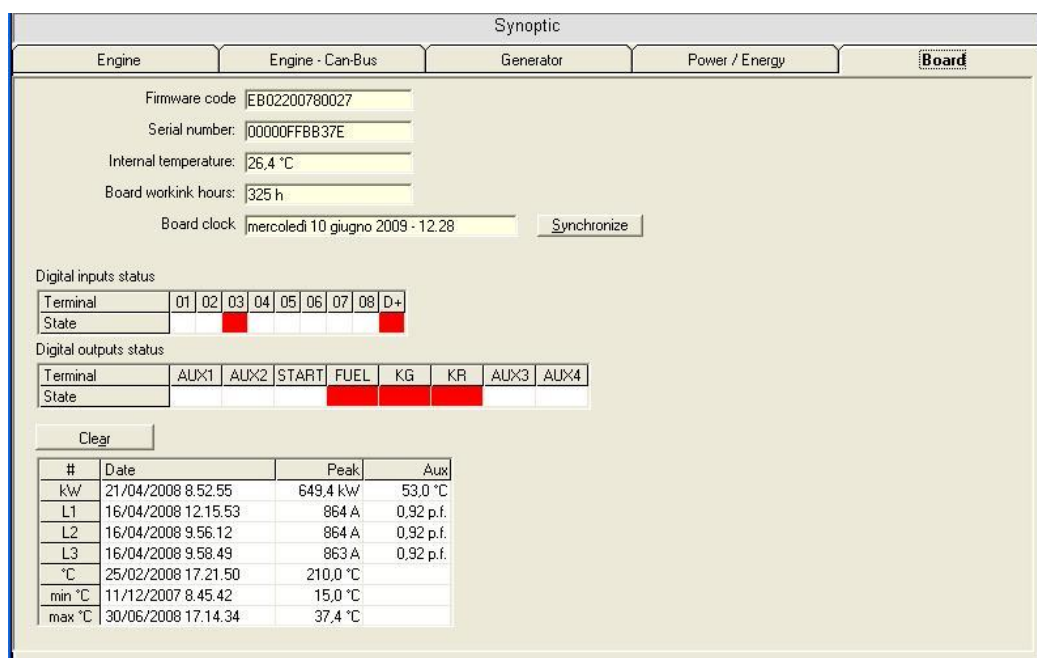
it displays the line voltages, phase voltages, current and frequency values of the generator in a graphic format (by means of pointer indicators). For single-phase systems, the line voltages and inapplicable phases are not shown. Also the auxiliary current measured by the board can be displayed (if enabled by means of the relevant parameters). Each pointer instrument also shows the warning and alarm thresholds for the corresponding measurement. If a fault related to an instrument is detected, a flashing icon is displayed (yellow for warnings and red for alarms).

- Power / Energy:**



it shows, in graphic format, the vectorial trend of voltage, power and current values of the generator. It also displays the same information in a table format, together with the active and reactive energy counters and their reset buttons. Two graphs are displayed: the first one shows the vectorial trend of currents with respect to their corresponding voltages (and also the phase rotation direction); the second one shows the phase and total power disposition in the four frames, by highlighting the type of load (inductive/capacitive) connected to each phase and total.

- Board:**



It displays some information related to the board, like the software code, univocal serial number and temperature measured inside the board. Moreover, the window displays the time acquired from the board clock and allows synchronizing it with the PC clock. It also displays two grids that show the status of the board input and output terminals (the active ones are displayed on red background).

Lastly, the peak measurements recorded by the board are displayed: total power peaks (associated with the engine temperature in that moment), current peaks on single phases (associated with the power factors relative to the phases in that moment), engine temperature peak and minimum and maximum temperature peaks inside the board. A button is provided to reset the peak values.

The menu bar and the toolbar feature the same controls:

- **Exit:** closes the window.
- **View - Synoptic:** it allows displaying the board general supervision pages (see previous figure). This function is always displayed and enabled. No access level is set for this control.
- **View - Parameters:** it allows displaying and modifying the board programming parameters (see 6.2.1). On this board, the parameters have protection codes and the serial port is protected by a password. The parameter window displays several folders, one for each menu present in the board local programming. This function is always displayed and enabled. No access level is set for this control.
- **View - Logs:** it is an uncommon menu. It only allows accessing a sub-menu where to select the type of history log to be displayed. This sub-menu features these three items:
 - **Events (PC):** it shows the general window (see 6.2.2.1) to manage the data recorded "upon variation" by the PC. This function is always displayed and enabled. No access level is set for this control. The stored events are:
 - Mains and gen-set contactor status (opening and closing).
 - Generator status (when present and when absent).
 - Mains status (when present and when absent).
 - The inhibition input status.
 - Engine status (any change between shut-off, start-up, running, cooling down, stopping).
 - Key switch position (any changes).
 - The maintenance request status.
 - Alarms and warnings (only upon activation).
 - **Analogue measures (PC):** it shows the general window (see 6.2.2.2) to manage the data periodically recorded by the PC. This function is always displayed and enabled. No access level is set for this control.
 - Mains voltage.
 - The line voltages, phase voltages, current and frequency values of the generator.
 - The total and phase powers of the system (active, reactive, apparent, power factor).
 - The start-up battery voltage.
 - The engine instruments (oil pressure, coolant temperature, fuel level and reference input voltage).
 - The engine rpm.
 - The voltage on the battery charger alternator.

- The board internal temperature.
- **Board history log:** it shows the window where to read and manage the log data recorded by the board on its internal memory.
- **Commands – Alarm reset:** it allows sending a command to the board to accept or clear all the stored faults. It carries out the same operation as when turning the board key switch to the OFF/RESET position and then back to its original position. This menu option is enabled only if at least one fault is stored in the board. If no fault is present, the option will be visible but not enabled. SicesSupervisor will request a control password if the user does not have the right access level.
- **Commands - Stop engine:** it allows sending a command to the board to stop the engine. It has the same function as the STOP button on the board. This menu item is always visible and enabled. SicesSupervisor will request a control password if the user does not have the right access level.
- **Commands – Engine test:** it allows sending a command to the board to start the engine for a test. It is visible only when the engine has not been already started for test. It is enabled if the board key switch is in the AUTO position and the engine is stopped (and therefore, the mains or the inhibition input is present). SicesSupervisor will request a control password if the user does not have the right access level. In case the communication with the board is interrupted after the engine has been started for test, the board will automatically shut down the engine after 60 seconds.
- **Commands – Stop test:** it allows interrupting the engine test. It is visible only when the engine has been started for test. SicesSupervisor will request a control password if the user does not have the right access level.
- **Commands – Load:** it allows controlling the load **only when the engine has been started for test**. It is visible only when the engine has been started for test. SicesSupervisor will request a control password if the user does not have the right access level.
- **Commands – Unload:** it allows controlling the unload **only when the engine has been started for test**. It is visible only when the engine has been started for test. SicesSupervisor will request a control password if the user does not have the right access level.
- **Commands – Lock:** it allows sending a command to inhibit the board operation. The board then reacts by activating the F12 alarm. This alarm cannot be deactivated (not even by powering off the board) unless by sending the command to remove the lock. It is visible only if the board is not in the lock mode yet. It is enabled only if the operator has an admin access level.
- **Commands – Unlock:** it allows sending a command to the board to deactivate the lock mode. The board reacts to this command by automatically resetting and deactivating the F12 alarm. It is visible only if the board is in the lock mode. It is enabled only if the operator has an admin access level.

7.3.4 Configuring the Remote Fault Messages

Programmable parameters

Access code: Access level:

3.1-Generator protections | 3.2-Engine protections | 3.3-Other protections | 4.1-Fuel pump | 4.2-Timers | 4.3-History log | 4.4-Serial communication | 4.5-Load

ID	Description	U.M.	value	New value
P.0451	Serial link type		0-Rs232/Rs485	0-Rs232/Rs485
P.0452	Device address		1	1
P.0453	Baud Rate	bps	9600	9600
P.0454	Settings		0-8 bit, no parity, 1 stop	0-8 bit, no parity, 1 stop
P.0455	Communication events		0	0
P.0456	Plant name		00000FFB837E	00000FFB837E
P.0457	Phone number (1)			
P.0458	Phone type (1)		0-Not used	0-Not used
P.0459	Phone number (2)			
P.0460	Phone type (2)		0-Not used	0-Not used
P.0461	Phone number (3)			
P.0462	Phone type (3)		0-Not used	0-Not used
P.0463	Phone number (4)			
P.0464	Phone type (4)		0-Not used	0-Not used
P.0465	Dial mode		T-By tones	T-By tones
P.0466	Number of ring before answer		1	1
P.0467	Number of SMS for each event		1	1
P.0468	Number of try for data calls		1	1

Change Copy Transmit Load Save Print

This figure shows in detail how to set the board communication options. To display it, click on "View - Parameters" from the detailed window, then click on the "Serial communication" folder. Here is a short description:

- P.0455: it allows selecting which events are to prompt a remote message (see the board operation manual).
- P.0456: it allows associating a string to the board. This string will be added to every SMS sent by the board and will be used by the PC receiving a phone call from the board to identify it. **NB: if you configure the board to route calls to a PC, this string must correspond to the name associated with the plant in the PC, and not to the name associated with the board.**
- P.0457, P.0459, P.0461, P.0463: used **only** if an analogue or GSM modem is connected to the board. These are four telephone numbers that can be used to configure the recipient for the SMS or data calls.
- P.0458, P.0460, P.0462, P.0464: used **only** if an analogue or GSM modem is connected to the board. They allow configuring what should be sent to each telephone number: SMS or calls to PCs.
- P.0465: used **only** if an analogue modem is connected to the board. It communicates to the board whether the phone line connected to the modem uses a pulse (decadic) or tone (multi-frequency) dialling mode.
- P.0466: used **only** if an analogue or GSM modem is connected to the board. It allows delaying the answer of the board to the phone calls according to the number of rings set. Leave it set to 1 if it is not relevant to you.
- P.0467: used **only** if a GSM modem is connected to the board. It allows specifying how many SMS should be sent to each number configured to receive SMS in case of new alarms or warnings.
- P.0468: used **only** if an analogue or GSM modem is connected to the board. It allows specifying how many call retries should be made to each of the numbers configured to receive data calls in case the line is engaged or it is not possible to establish a communication.

When activating the remote fault message function, the operations vary according to the connection type: analogue modem, GSM or Ethernet.

- Ethernet: in this case, you only have to configure when the board should send a remote message (parameter P.0455).
- First of all, you need to set the phone numbers (1-4) by assigning each of them to a function (not used, SMS or data calls). If the modem is not a GSM one, the option "for SMS" has no meaning and does not produce any effects. If you are using SMS, you should set how many SMS will be sent to each of the numbers per event (parameter P.0467, typically set to 1). If you are using data calls, you should set the number of call retries for each of the numbers (parameter P.0468, typically higher than 1). You then need to specify in parameter P.0456 the plant name as configured in the PCs. Lastly, you need to choose when the board should send the remote message: the same instructions for the Ethernet connection apply.

7.4 EM1100

This board only supports the ModBus RTU protocol (serial port is provided as an option), it has a serial address configurable by means of parameter P.59 and the communication characteristics (baud rate, etc.) can be configured by means of parameters P.60 and P.61. These information should be kept in mind when configuring the plant. Moreover, this board does **not** have a history log and an internal hardware clock, nor carries out power measurements, and is **not** compatible with modems. It is **not** able to route calls to a PC in case of faults. It is compatible with the Ethernet network.

7.4.1 Configuring the Board



0042_033_EN

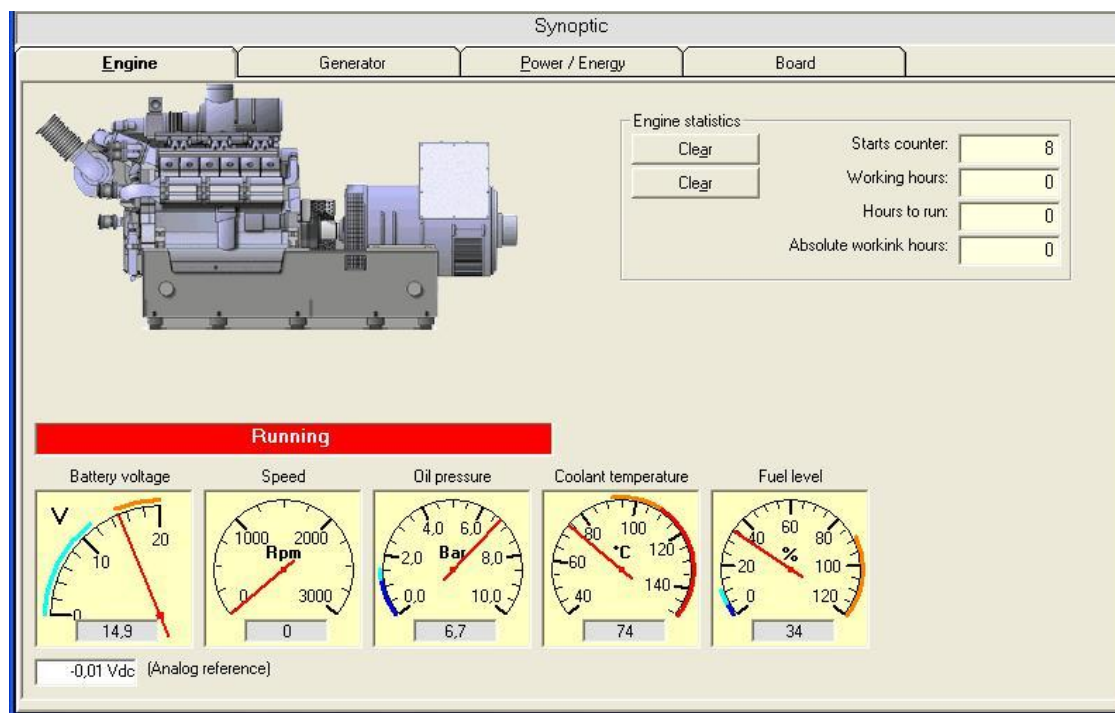
No special configuration is needed. Even if it is not compulsory, it may be useful to configure the major and minor release of the board software. The reference for the major and minor release can be found on the back of the board, under the message "SW 53xxyy". The xx number corresponds to the major release, the yy number to the minor release. These settings are not compulsory since SicesSupervisor automatically acquires these information and carries out the configuration (upon the operator's authorization) when connecting to the board for the first time.

7.4.2 Information Displayed in the "Unifilar" Window

The following information are displayed:

- The voltage, current and frequency values of the generator (the single-phase / three-phase configuration is acquired from the board).
- The engine status with start-up counter, working hours partial counter and absolute counter.
- The status of the generator.
- The power measurements (active, reactive, apparent, power factor, load type, active and reactive energy counters).
- The battery voltage and, if configured on the board, the instruments for oil pressure, coolant temperature and fuel level.
- The engine rpm (if configured on the board).
- Any faults.

7.4.3 Detailed Window



The figure shows the supervision window that allows for detailed analysis of a EM1100 board. When displayed, the title bar shows the name associated with the board. In the example shown in the figure, the displaying area is used to show the engine status and that of the engine instruments. Four synoptic pages are available:

- **Engine:** in addition to the engine status, it displays (by means of pointer instruments) the battery voltage and, if enabled by means of the programming parameters, the values for oil pressure, coolant temperature, fuel level and rpm. Each pointer instrument also shows the warning and alarm thresholds for these measurements. It also shows the voltage measured on the "ANALOG.REF" input, that indicates the voltage difference between the start-up battery negative pole and the engine frame. If a fault related to an instrument is detected, a flashing icon is displayed (yellow for warnings and red for alarms).

Also the engine counters are displayed, together with their reset buttons (they also include the hours-to-maintenance and rent expiration counter, whose values decrease instead of increasing).

- **Generator:** it displays the voltage, current and frequency values of the generator in a graphic format (by means of pointer indicators). For single-phase systems, the inapplicable phases are not shown. Each pointer instrument also shows the warning and alarm thresholds for the corresponding measurement. If an alarm related to an instrument is activated, a flashing icon is displayed (yellow for warnings and red for alarms).
- **Power / Energy:** it shows, in graphic form, the vectorial trend of voltage, power and current values of the generator. It also displays the same information in a table format, together with the active and reactive energy counters and their reset buttons. Two graphs are displayed: the first one shows the vectorial trend of currents with respect to their corresponding voltages (and also the phase rotation direction); the second one shows the phase and total power disposition in the four frames, by highlighting the type of load (inductive/capacitive) connected to each phase and total.
- **Board:** it displays some information related to the board, like the software code and temperature measured inside the board. It also displays two grids that show the status of the board input and output terminals (the active ones are displayed on red background).

The menu bar and the toolbar feature the same controls:

- **Exit:** closes the window.
- **View - Synoptic:** it allows displaying the board general supervision pages (see previous figure). This function is always displayed and enabled. No access level is set for this control.
- **View - Parameters:** it allows displaying and modifying the board programming parameters (see 6.2.1). On this board, the parameters do not have protection codes and the serial port is not protected by a password. The parameter window displays several folders, one for each menu present in the board local programming. This function is always displayed and enabled. No access level is set for this control.
- **View - Logs:** it is an uncommon menu. It only allows accessing a sub-menu where to select the type of history log to be displayed. This sub-menu features the two following items:
 - **Events (PC):** it shows the general window (see 6.2.2.1) to manage the data recorded "upon variation" by the PC. This function is always displayed and enabled. No access level is set for this control. The stored events are:
 - Generator status (when present and when absent).
 - Engine status (any change between shut-off, start-up, running, cooling down, stopping).
 - The maintenance request status.
 - Alarms and warnings (only upon activation).
 - **Analogue measures (PC):** it shows the general window (see 6.2.2.2) to manage the data periodically recorded by the PC. This function is always displayed and enabled. No access level is set for this control.
 - The voltage, current and frequency values of the generator.
 - The total and phase powers of the system (active, reactive, apparent, power factor).
 - The start-up battery voltage.

- The engine instruments (oil pressure, coolant temperature, fuel level and reference input voltage).
- The engine rpm.
- The board internal temperature.
- **Commands – Alarm reset:** it allows sending a command to the board to accept or clear all the stored faults. It is the same as powering off and then on again the board (except for the start-up sequence which is not reactivated). This menu option is enabled only if at least one fault is stored in the board. If no fault is present, the option will be visible but not enabled. SicesSupervisor will request a control password if the user does not have the right access level.
- **Commands – Acknowledge:** it allows sending a command to the board to accept all the faults present and deactivate the horn. It has the same function as the "MODE/ACK" button on the board panel. This menu option is enabled only if at least one fault not yet acknowledged is stored in the board. If no fault is present, the option will be visible but not enabled. SicesSupervisor will request a control password if the user does not have the right access level.
- **Commands - Stop engine:** it allows sending a command to the board to stop the engine. It has the same function as the STOP button on the board. This menu item is always visible and enabled. SicesSupervisor will request a control password if the user does not have the right access level.
- **Commands – Start sequence:** the EM1100 board is a manual one, and therefore the remote start-up of the engine is not possible. It must be manually started within a configurable interval after the board activation. If this interval has elapsed and the engine has not been started, the board activates the "Overcrank" alarm. Using this control it is possible to start this interval again. SicesSupervisor will request a control password if the user does not have the right access level.

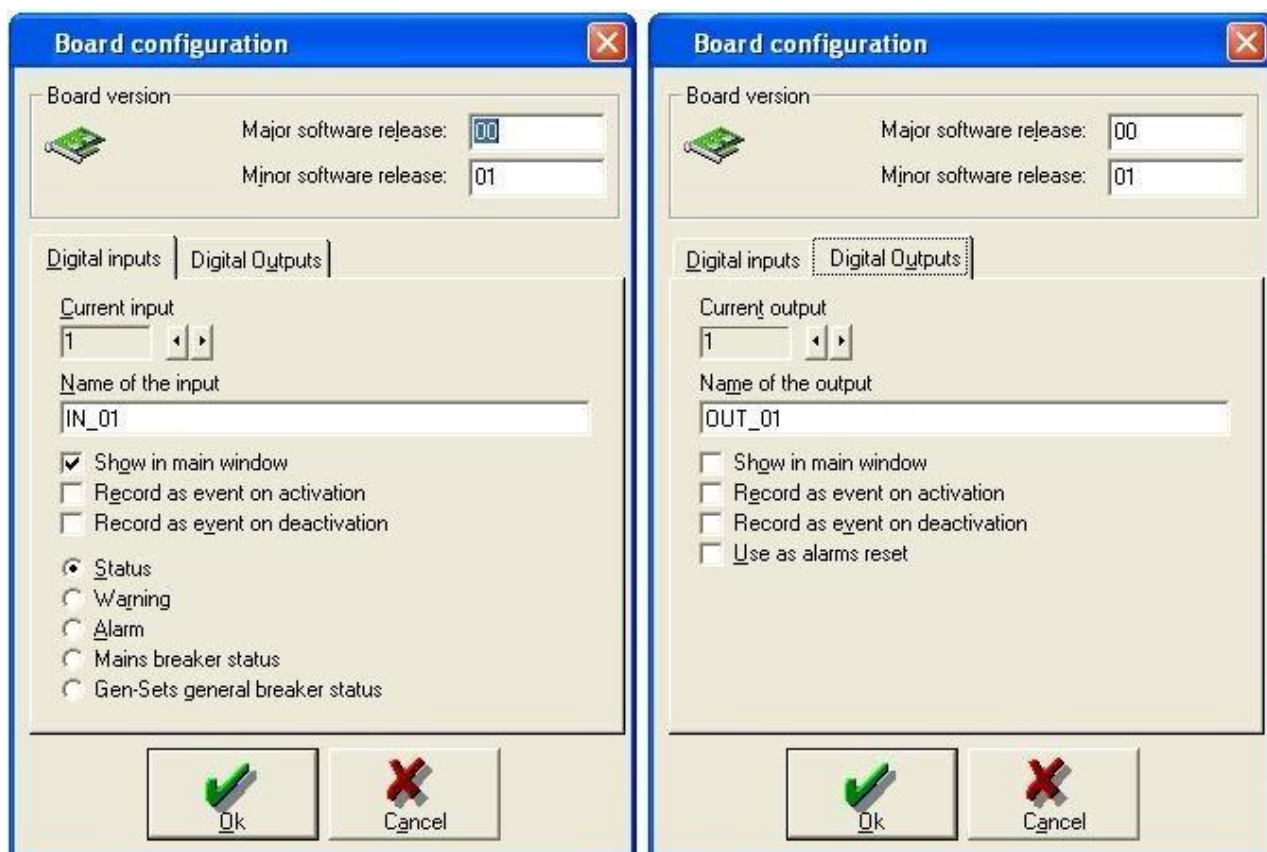
8. Auxiliary Boards

8.1 ModBus/TCP Gateway

This board allows connecting the devices (connected through the serial port RS232/RS485) to a Ethernet network. It only supports the ModBus RTU protocol. It has a fixed serial address equal to 255. Its communication characteristics (baud rate, etc.) can be configured by means of the dedicated tool "**ModBus Data Gateway Configuration Tool**" (MDGConfig.exe), by connecting to the serial port. These information should be kept in mind when configuring the plant. Moreover, this board does not have an internal history log and clock. It is compatible only with the Ethernet network.

For the operation and programming of this board, refer to the "**MDGConfig Documentation**".

8.1.1 Configuring the Board



0042_035_EN

Even if it is not compulsory, it may be useful to configure the major and minor release of the board software. The reference for the major and minor release can be found on the back of the board, under the message "SW 49xxyy". The xx number corresponds to the major release, the yy number to the minor release. These settings are not compulsory since SicesSupervisor automatically acquires these information and carries out the configuration (upon the operator's authorization) when connecting to the board for the first time.

The board is equipped with four configurable digital outputs and inputs. The previous figures show the configuration of, respectively, an input and an output (to pass to the next ones, click on the two arrow keys under the option "Current input" and "Current output").

The configurations common to inputs and outputs are:

- Possibility of adding a description to the resource (displayed in the supervision window or in the window for the recordings upon events).
- Possibility to choose whether to display or not the resource in the "unifilar" window (as a default setting, all the inputs are displayed but not the outputs).
- Possibility to choose whether the resource has to be recorded by the PC in the history log if its status changes (it is possible to choose whether to record it only upon activation, or deactivation or both cases).

The outputs cannot be configured for warning/alarm status. It is allowed to activate only one output as an alarm reset control.

Only for inputs, it is also possible to specify their type:

- **Status:** default option. **Green** if active.

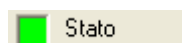
- **Warning:** when the input is active, a flashing icon showing a **yellow triangle** is displayed and the case appears in **yellow**. Moreover, if one of the other boards of the plant requires a remote message, SicesSupervisor will assign also this input (if active) as cause of the call.
- **Alarm:** when the input is active, a flashing icon showing a **red triangle** is displayed and the case appears in **red**. Moreover, if one of the other boards of the plant requires a remote message, SicesSupervisor will assign also this input (if active) as cause of the call.
- **Mains breaker status: green** if active. In a plant composed by many parallel gen-sets, the user changeover is not usually managed by any of the gen-sets. To allow SicesSupervisor to correctly display the status it is possible to connect the mains and gen-sets breaker status to two Gateway inputs. This option indicates that a mains breaker status is connected to the relevant input (active input means breaker closed). NB: if you select this option, this input must be shown in the "unifilar" diagram to allow SicesSupervisor to correctly display the changeover.
- **Gen-sets general breaker status: green** if active. The description above also applies to this point. This option indicates that the gen-sets general breaker status is connected to this input (the one that closes the gen-sets parallel lines on the user lines; active input means breaker closed). NB: if you select this option, this input must be shown in the "unifilar" diagram to allow SicesSupervisor to correctly display the changeover.

8.1.2 Information Displayed in the "Unifilar" Window

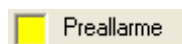
Both the inputs and outputs selected during the configuration are displayed as indicator lights.

The **inputs**, when active, become:

Green – if configured as status



Yellow – if configured as Warnings



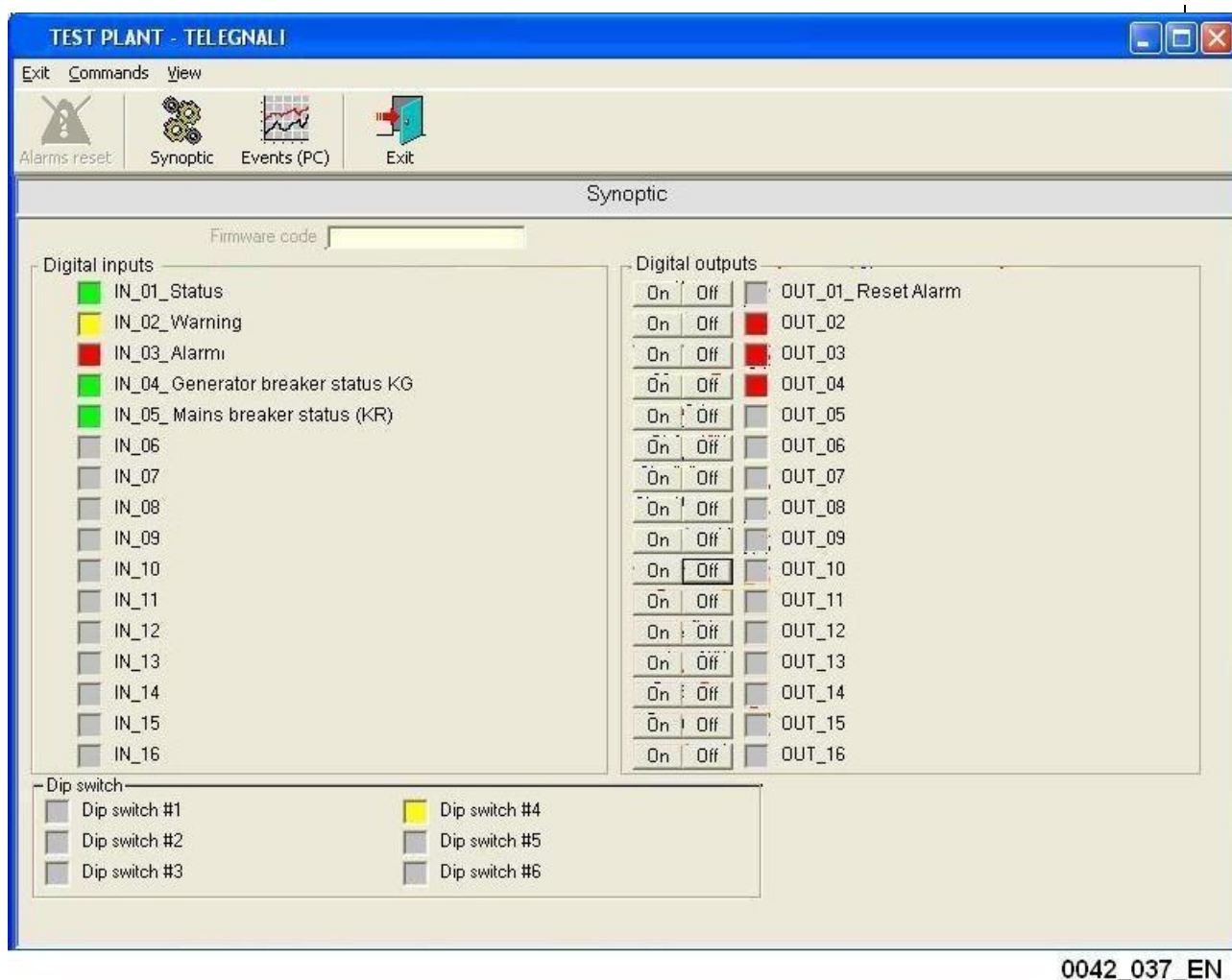
Red – if configured as Alarms



The **outputs**, when active, become **red**.

Both the inputs and outputs are gray if not active. The alarm or warning symbols (if configured) may appear flashing on the side of the active inputs. By clicking on the On/Off buttons it is possible to control the output status.

8.1.3 Detailed Window



0042_037_EN

The figure shows the supervision window that allows for detailed analysis of the board. When displayed, the title bar shows the name associated with the board.

The displaying area shows the status of all the inputs and outputs (allowing for activation/deactivation), the position of the two dip switches on the board and the status of the non-volatile memory (which contains some configurations such as IP addresses, etc.)

To activate an output, click on its **On** button. To deactivate it, click on the **Off** button. A confirmation message will be displayed.

To carry out the signal activation/deactivation directly without confirmation, click while holding the **CTRL** key pressed.

The menu bar and the toolbar feature the same controls:

- **Exit:** closes the window.
- **View - Synoptic:** it allows displaying the board general supervision pages (see previous figure). This function is always displayed and enabled. No access level is set for this control.
- **View - Events (PC):** it shows the general window (see 6.2.2.1) to manage the data recorded "upon variation" by the PC. This function is always displayed and enabled. No access level is set for this control. The stored events correspond to the inputs and outputs especially configured for this purpose.

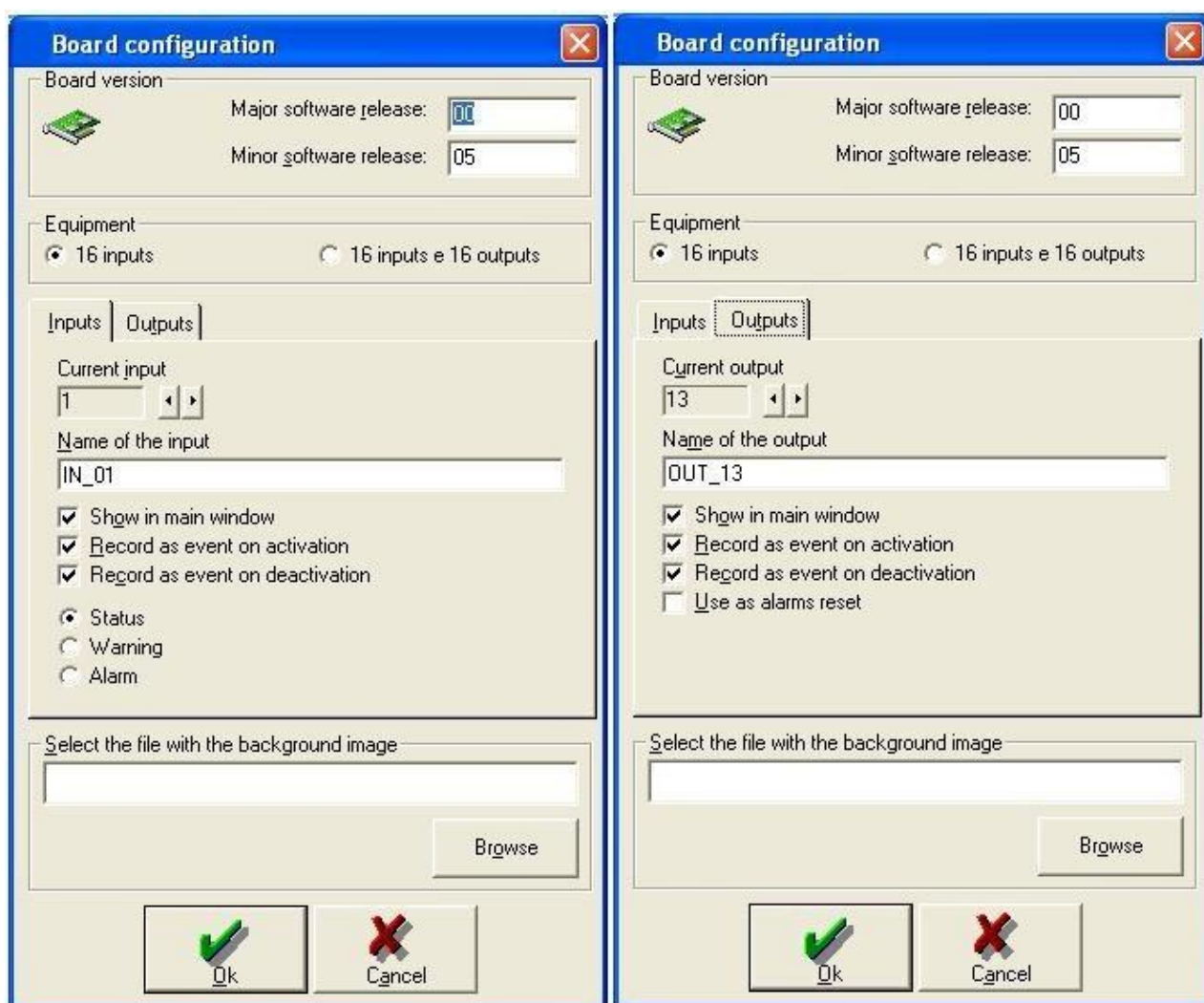
- **Alarm reset** – This command is available when at least one input is configured as alarm or warning and at least one output is configured as Alarm reset. In this case, if one of the alarm or warning signals is active, this button becomes enabled. By clicking on this button, the alarm reset output is activated (1-second pulse).

8.2 TELESEGNALI

This auxiliary board allows piloting inputs and outputs by means of the RS232 serial port by using the ModBus RTU protocol. It has a serial address configurable by means of the dip switches. The communication characteristics (baud rate, etc.) are fixed and equal to 9,600 bauds, 8 data bits, 1 stop bit and no parity bits. These information should be kept in mind when configuring the plant. Moreover, this board does **not** have an internal history log and clock. It is compatible with the Ethernet network, via Gateway board.

It is possible to connect this board to the second serial port of the DST4600A and DST4601 boards. In this case, you will have to tick the relevant field during configuration. In addition, the board should be given the same address in SicesSupervisor as the DST4600A or DST4601 board to which it is connected.

8.2.1 Configuring the Board



0042_038_EN

Even if it is not compulsory, it may be useful to configure the major and minor release of the board software. The reference for the major and minor release can be found on the back of

the board, under the message "SW 41xxy". The xx number corresponds to the major release, the yy number to the minor release. These settings are not compulsory since SicesSupervisor automatically acquires these information and carries out the configuration (upon the operator's authorization) when connecting to the board for the first time. NB: the automatic configuration is not available if the board is connected to the second serial port of a DST4600A or DST4601 board.

Two types of configuration should be carried out:

- **hardware:** you need to choose the board equipment. The board can manage up to 16 inputs, 16 inputs and 16 outputs or 32 outputs. In the "Equipment" frame it is possible to specify the equipment of the board in the plant.
- **link mode:** the board can be connected directly to a rs-485 Bus or to the second serial port of a DST4601 or DST4600A board. The "Link mode" frame allows specifying this configuration to SicesSupervisor.

The previous figures show the configuration of, respectively, an input and an output (to pass to the next ones, click on the two arrow keys under the option "Current input" and "Current output").

The configurations common to inputs and outputs are:

- Possibility of adding a description to the resource (displayed in the supervision window or in the window for the recordings upon events).
- Possibility to choose whether to display or not the resource in the "unifilar" window (as a default setting, all the inputs are displayed but not the outputs).
- Possibility to choose whether the resource has to be recorded by the PC in the history log if its status changes (it is possible to choose whether to record it only upon activation, or deactivation or both cases).

Only for inputs, it is also possible to specify their type:

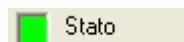
- **Status:** default setting.
- **Warning:** when the input is active, a yellow flashing triangle is displayed. Moreover, if one of the other boards of the plant requires a remote message, SicesSupervisor will assign also this input (if active) as cause of the call.
- **Alarm:** when the input is active, a red flashing triangle is displayed. Moreover, if one of the other boards of the plant requires a remote message, SicesSupervisor will assign also this input (if active) as cause of the call.
- **Mains breaker status:** In a plant composed by many parallel gen-sets, the user changeover is not usually managed by any of the gen-sets. To allow SicesSupervisor to correctly display its status it is possible to connect the mains and gen-sets breaker status to two inputs of the TELESEGNALI. This option indicates that a mains breaker status is connected to the relevant input (active input means breaker closed). NB: if you select this option, this input must be shown in the "unifilar" diagram to allow SicesSupervisor to correctly display the changeover.
- **Gen-sets general breaker status:** the description above also applies to this point. This option indicates that the gen-sets general breaker status is connected to this input (the one that closes the gen-sets parallel lines on the user lines; active input means breaker closed). NB: if you select this option, this input must be shown in the "unifilar" diagram to allow SicesSupervisor to correctly display the changeover.

8.2.2 Information Displayed in the "Unifilar" Window

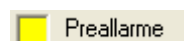
Both the inputs and outputs selected during the configuration are displayed as indicator lights.

The **inputs**, when active, become:

Green – if configured as status



Yellow – if configured as Warnings



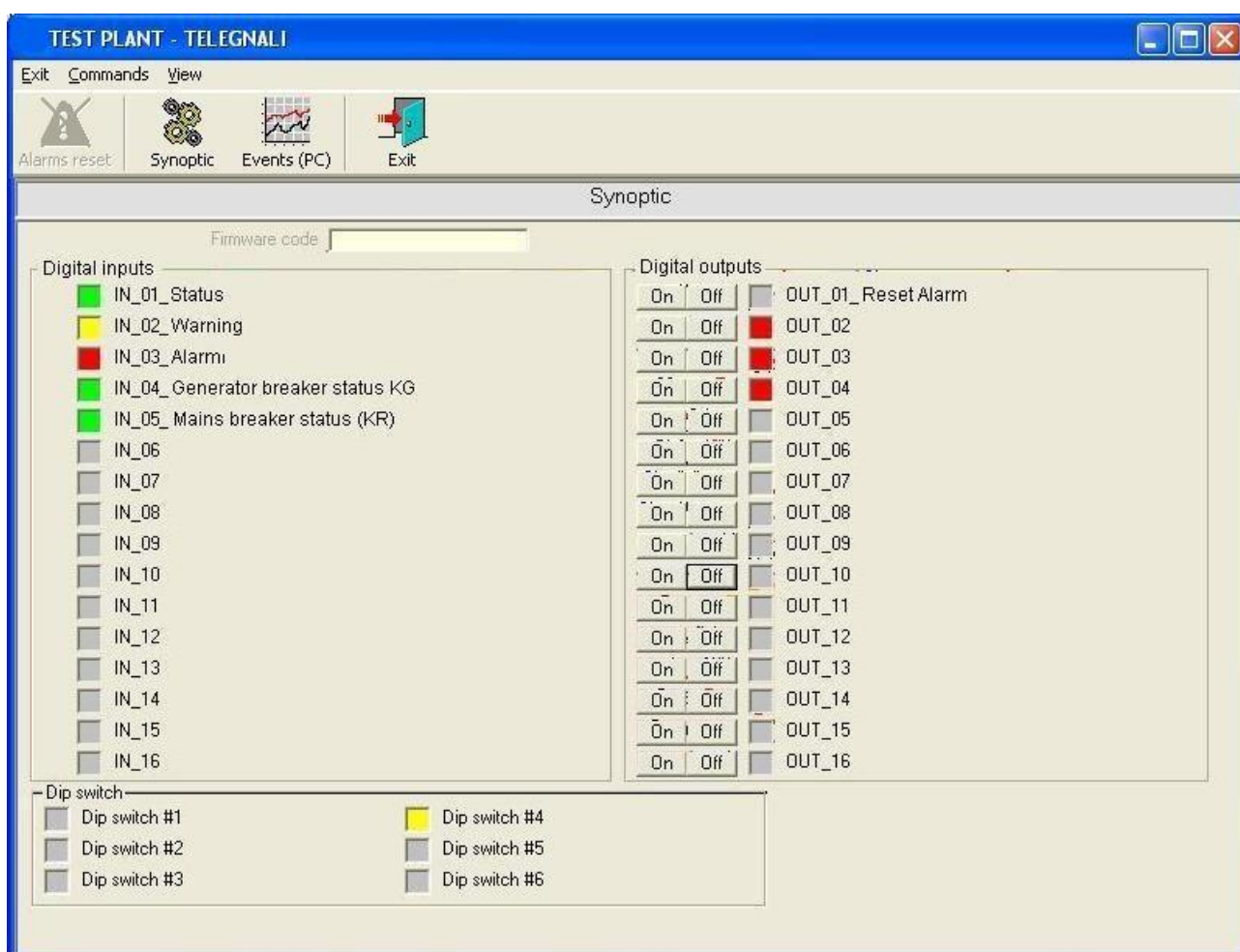
Red – if configured as Alarms



The **outputs**, when active, become **red**.

Both the inputs and outputs are gray if not active. The alarm or warning symbols (if configured) may appear flashing on the side of the active inputs. By clicking on the On/Off buttons it is possible to control the output status.

8.2.3 Detailed Window



0042_037_EN

The figure shows the supervision window that allows for detailed analysis of the board. When displayed, the title bar shows the name associated with the board.

The displaying area shows the status of all the inputs and outputs (allowing for activation/deactivation), the position of the six dip switches on the board and the software release (only if not connected to the second serial port of the DST4600A or DST4601 board).

To activate an output, click on its **On** button. To deactivate it, click on the **Off** button. A confirmation message will be displayed.

To carry out the signal activation/deactivation directly without confirmation, click while holding the **CTRL** key pressed.

The menu bar and the toolbar feature the same controls:

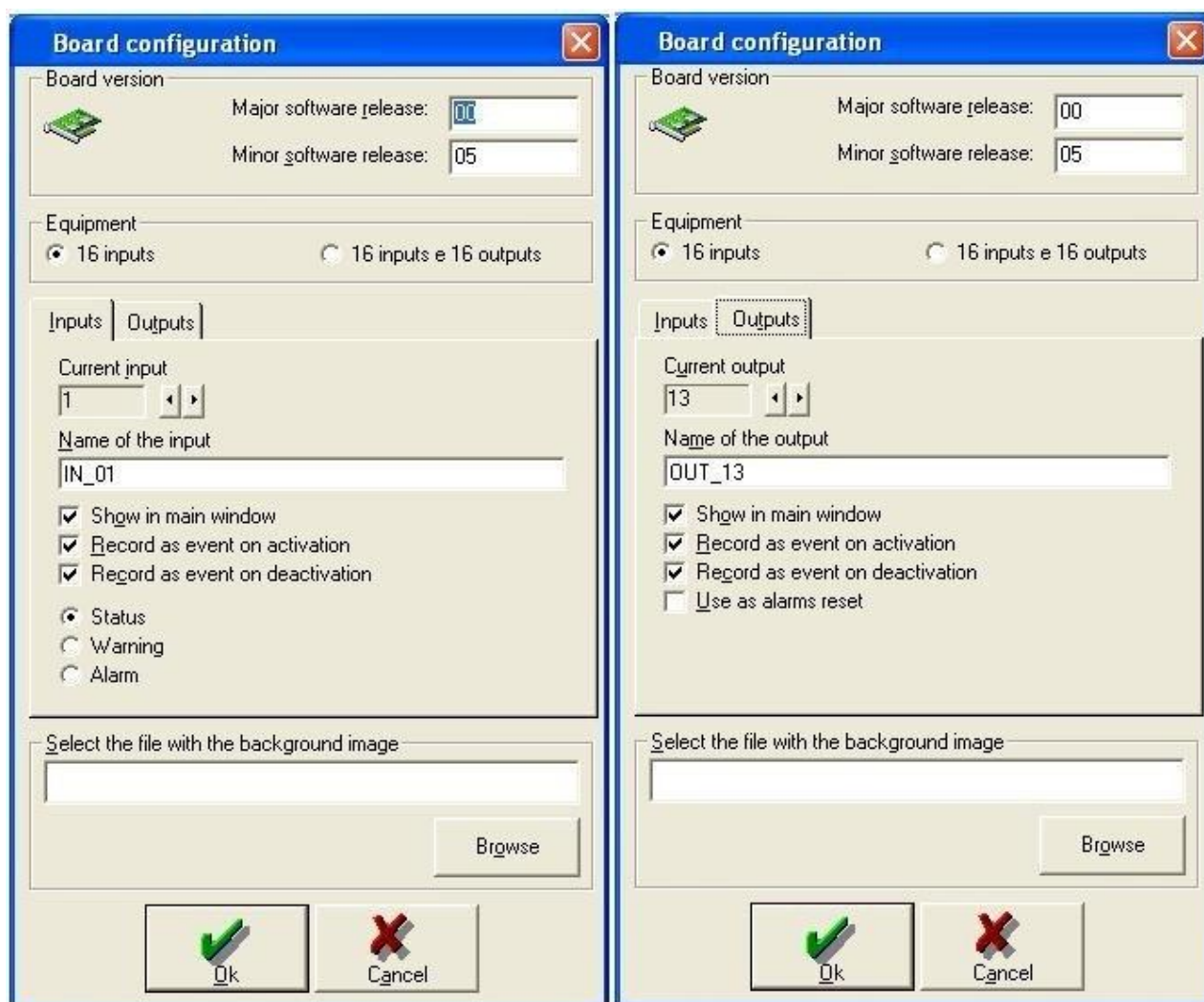
- **Exit:** closes the window.
- **View - Synoptic:** it allows displaying the board general supervision pages (see previous figure). This function is always displayed and enabled. No access level is set for this control.
- **View - Events (PC):** it shows the general window (see 6.2.2.1) to manage the data recorded "upon variation" by the PC. This function is always displayed and enabled. No access level is set for this control. The stored events correspond to the inputs and outputs especially configured for this purpose.
- **Alarm reset** – This command is available when at least one input is configured as alarm or warning and at least one output is configured as Alarm reset. In this case, if one of the alarm or warning signals is active, this button becomes enabled. By clicking on this button, the alarm reset output is activated (1-second pulse).

8.3 GDC – GSM Data Communicator

This board allows monitoring the statuses of a plant and activating the digital outputs from remote. Several connection types can be used: direct (RS232), via telephone network (analogue modem), via mobile network (GSM modem), or via Ethernet network (Gateway connected to the RS232 serial port). It can connect to a PC, send SMS to a mobile phone and even receive commands via SMS.

It supports the ModBus RTU protocol for direct connection. It has a serial address configurable by means of the dip switches. The communication characteristics (baud rate, etc.) are fixed and equal to 9,600 bauds, no parity control, 8 data bits and 1 stop bit (9,600, N, 8, 1). These information should be kept in mind when configuring the plant. Moreover, this board has an internal history log and clock.

8.3.1 Configuring the Board



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Even if it is not compulsory, it may be useful to configure the major and minor release of the board software. The reference for the major and minor release can be found on the back of the board, under the message "SW 41xxy". The xx number corresponds to the major release, the yy number to the minor release. These settings are not compulsory since SicesSupervisor automatically acquires these information and carries out the configuration (upon the operator's authorization) when connecting to the board for the first time. NB: the automatic configuration is not available if the board is connected to the second serial port of a DST4600A or DST4601 board.

The following configuration is required:

- hardware: you need to choose the board equipment. The board can manage up to 16 inputs or 16 inputs and 16 outputs. In the "Equipment" frame it is possible to specify the equipment of the board in the plant.

The previous figures show the configuration of, respectively, an input and an output (to pass to the next ones, click on the two arrow keys under the option "Current input" and "Current output").

The configurations common to inputs and outputs are:

- Possibility of adding a description to the resource (displayed in the supervision window or in the window for the recordings upon events).

- Possibility to choose whether to display or not the resource in the "unifilar" window (as a default setting, all the inputs are displayed but not the outputs).
- Possibility to choose whether the resource has to be recorded by the PC in the history log if its status changes (it is possible to choose whether to record it only upon activation, or deactivation or both cases).

The outputs cannot be configured for warning/alarm status. It is allowed to activate only one output as an alarm reset control.

Only for inputs, it is also possible to specify their type:

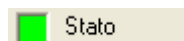
- **Status:** default option. **Green** if active.
- **Warning:** when the input is active, a flashing icon showing a **yellow triangle** is displayed and the case appears in **yellow**. Moreover, if one of the other boards of the plant requires a remote message, SicesSupervisor will assign also this input (if active) as cause of the call.
- **Alarm:** when the input is active, a flashing icon showing a **red triangle** is displayed and the case appears in **red**. Moreover, if one of the other boards of the plant requires a remote message, SicesSupervisor will assign also this input (if active) as cause of the call.

8.3.2 Information Displayed in the "Unifilar" Window

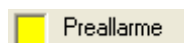
Both the inputs and outputs selected during the configuration are displayed as indicator lights.

The **inputs**, when active, become:

Green – if configured as status



Yellow – if configured as Warnings



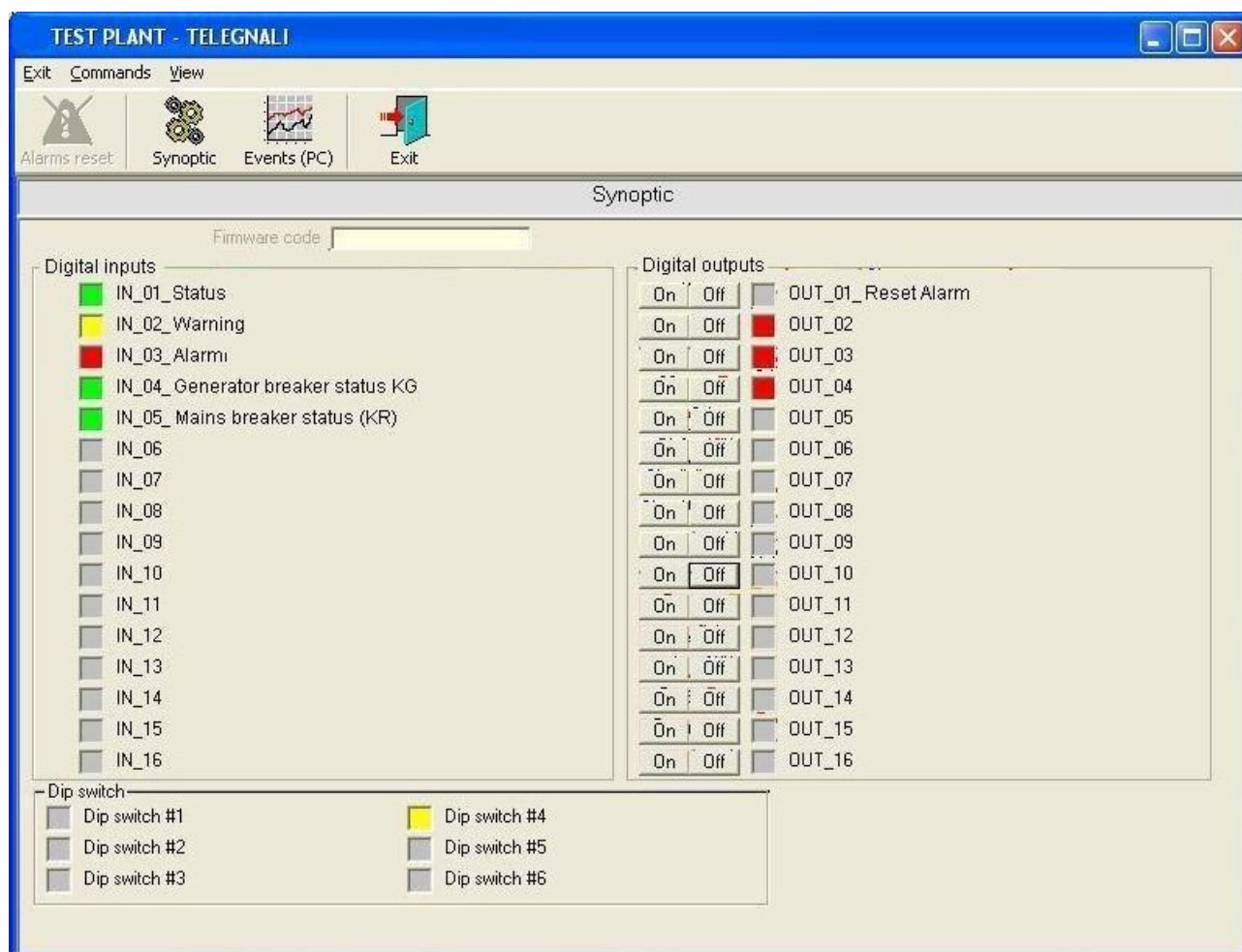
Red – if configured as Alarms



The **outputs**, when active, become **red**.

Both the inputs and outputs are gray if not active. The alarm or warning symbols (if configured) may appear flashing on the side of the active inputs.

8.3.3 Detailed Window



0042_037_EN

The figure shows the supervision window that allows for detailed analysis of the board. When displayed, the title bar shows the name associated with the board.

The displaying area shows the status of all the inputs and outputs (allowing for activation/deactivation), and the firmware code.

The menu bar and the toolbar feature the same controls:

- **Exit:** closes the window.
- **View - Synoptic:** it allows displaying the board general supervision pages (see previous figure). This function is always displayed and enabled. No access level is set for this control.
- **View - Parameters:** it allows displaying and modifying the board programming parameters (see 6.2.1). On this board, the parameters have protection codes and the serial port is protected by a password. The parameter window displays several folders, one for each menu present in the board local programming. This function is always displayed and enabled. No access level is set for this control.
- **View - Logs:** it is an uncommon menu. It only allows accessing a sub-menu where to select the type of history log to be displayed. This sub-menu features these three items:

- **Events (PC):** it shows the general window (see 6.2.2.1) to manage the data recorded "upon variation" by the PC. This function is always displayed and enabled. No access level is set for this control.
- **Board history log:** it shows the window where to read and manage the log data recorded by the board on its internal memory.
- **Alarm reset** – This command is available when at least one input is configured as alarm or warning and at least one output is configured as Alarm reset. In this case, if one of the alarm or warning signals is active, this button becomes enabled. By clicking on this button, the alarm reset output is activated (1-second pulse).

9. Data Calls

SicesSupervisor can receive and manage data calls in case of faults from the plants. This function must be enabled using the license key. In order to use this function check that:

- The PC is turned on.
- SicesSupervisor is started.
- The communication device selected is a modem or the Ethernet network.
- The plants are correctly configured.

9.1 Plant Configuration for Data Calls

If you use a modem as communication device, then only those plants having just one board for gen-set control can send data calls. On the contrary, if you use an Ethernet connection, any plant can send data calls (after correctly configuring the Gateway board).

But, as a matter of facts, only the DST4600A, DST4601 and DST4400 boards are now able to send data calls. See the relevant sections on how to configure these boards for the remote fault message function (data calls).

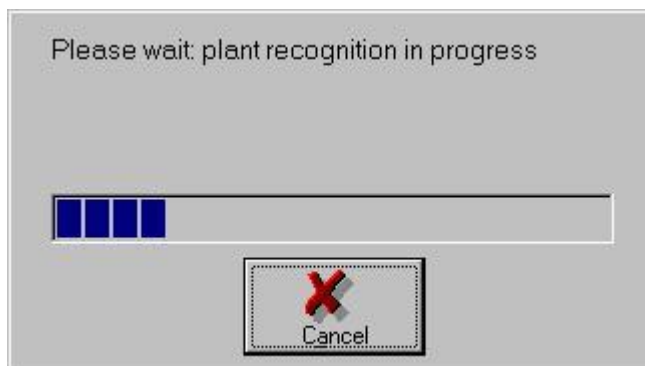
9.2 Receiving a Call

When SicesSupervisor receives a call, the following window is displayed:



If the operator is present he/she may accept or reject the call by pressing the relevant buttons. If no operator is present and the number of rings was set (see 3.4.1.2.2), SicesSupervisor will wait for this number of rings and then automatically answer the call.

Once the connection is correctly established, SicesSupervisor starts the authentication procedure. During this phase the following window is shown:



If SicesSupervisor cannot identify the plant because of communication problems, the connection will be interrupted. If the plant is identified and it corresponds to one of the configured plants, SicesSupervisor will open the supervision window and start downloading the board history logs. To know on which boards the history logs are available and for more information on read modes, refer to the sections relevant to each board.

At the end, the following window is displayed:



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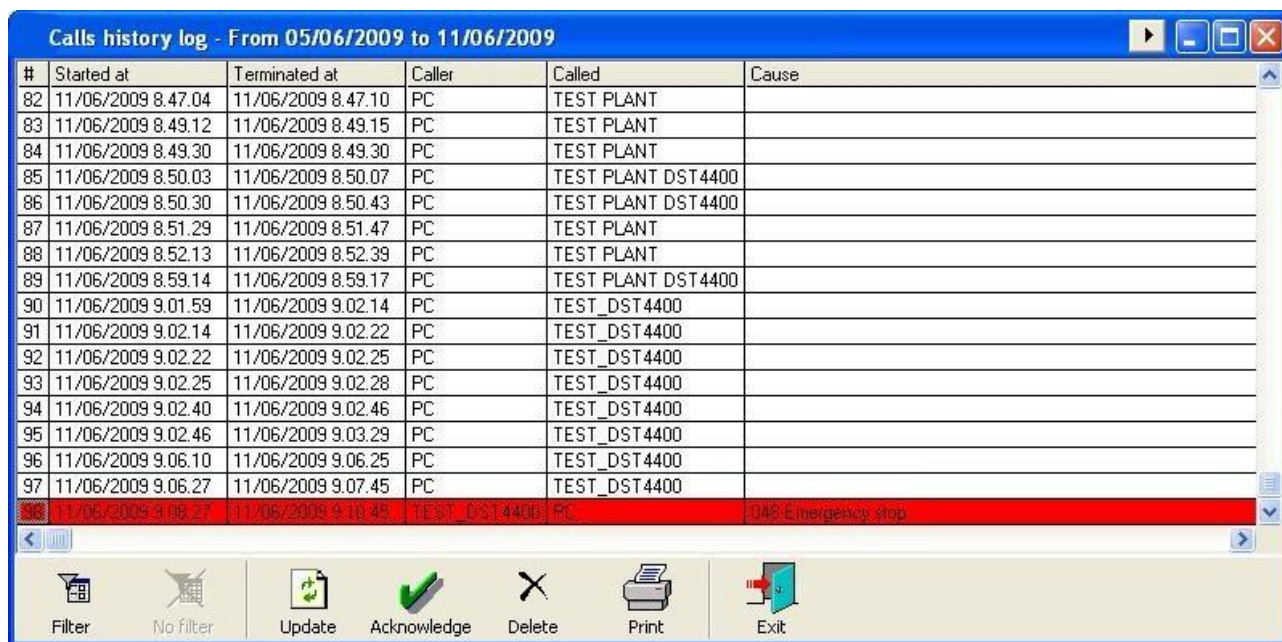
If the operator is present, he/she may decide to keep the connection active in order to carry out a deep analysis. If this is not the case, SicesSupervisor will interrupt the connection after 10 seconds, in order to be able to receive other data calls.

9.3 Messages to the Operator

When SicesSupervisor answers an incoming call it carries out two operations:

- It displays an envelope icon in the second last panel of the status bar. This means that an incoming call was received which has not been processed by the operators yet.
- If the PC is equipped with a sound card, the file "Sounds\NewEntryCalls.wav" (provided that it is stored in the same directory as SicesSupervisor) will be played continuously for 60 seconds. Its function is to call the attention of an operator. The operator may also record any other message in WAV format and assign the above-mentioned name to it.

At the end of the communication, SicesSupervisor records the incoming call and its cause (if detected) in a log database. It also open a window showing the log of the calls:



#	Started at	Terminated at	Caller	Called	Cause
82	11/06/2009 8.47.04	11/06/2009 8.47.10	PC	TEST PLANT	
83	11/06/2009 8.49.12	11/06/2009 8.49.15	PC	TEST PLANT	
84	11/06/2009 8.49.30	11/06/2009 8.49.30	PC	TEST PLANT	
85	11/06/2009 8.50.03	11/06/2009 8.50.07	PC	TEST PLANT DST4400	
86	11/06/2009 8.50.30	11/06/2009 8.50.43	PC	TEST PLANT DST4400	
87	11/06/2009 8.51.29	11/06/2009 8.51.47	PC	TEST PLANT	
88	11/06/2009 8.52.13	11/06/2009 8.52.39	PC	TEST PLANT	
89	11/06/2009 8.59.14	11/06/2009 8.59.17	PC	TEST PLANT DST4400	
90	11/06/2009 9.01.59	11/06/2009 9.02.14	PC	TEST_DST4400	
91	11/06/2009 9.02.14	11/06/2009 9.02.22	PC	TEST_DST4400	
92	11/06/2009 9.02.22	11/06/2009 9.02.25	PC	TEST_DST4400	
93	11/06/2009 9.02.25	11/06/2009 9.02.28	PC	TEST_DST4400	
94	11/06/2009 9.02.40	11/06/2009 9.02.46	PC	TEST_DST4400	
95	11/06/2009 9.02.46	11/06/2009 9.03.29	PC	TEST_DST4400	
96	11/06/2009 9.06.10	11/06/2009 9.06.25	PC	TEST_DST4400	
97	11/06/2009 9.06.27	11/06/2009 9.07.45	PC	TEST_DST4400	
98	11/06/2009 9.08.27	11/06/2009 9.10.45	TEST_DST4400, PC		045 Emergency stop

Buttons: Filter, No filter, Update, Acknowledge, Delete, Print, Exit

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This window offers a list of all the calls, received or made. Every call also shows the date/time of start and end of the call, together with the name of the plant and PC involved. If the call was made by a plant to a PC, also the cause(s) of the call are shown. In the example in the figure, the call was caused by the board managing the gen-set (due to an emergency stop). Also an alarm on the Gateway was active in that moment and both have been recorded. The incoming calls are shown on red background. By clicking on one of them and by pressing the "**Acknowledge**" button the background colour turns white again. It is possible to print the grid content or export it in HTML or text format ("**Print**" button). It is also possible to select a group of rows and delete them (from the database) using the "**Delete**" button (admin password required). The "**Update**" button is useful only for networking. By pressing it, the database grid is updated and therefore also the calls received or made by other PCs are shown. NB: only calls to and from the plants managed by this PC are shown.

The database automatically shows the calls of the previous 7 days. To display previous calls or select other calls in the database use the following filters:

The "**Filter**" command, to select a special period and the type of messages to be displayed.

The "**No filter**" command, to remove the selection set using the Filter command.

To facilitate the operator, the last filter set is saved and proposed again when next opening the call history log.

10. Networking

Starting from release 2.00, SicesSupervisor supports a networking function to share data between several PCs connected via Ethernet network. The networking function via Ethernet is provided as an option and should be requested upon purchasing of the product. S.I.C.E.S. s.r.l. will provide a license key to allow enabling the function. The networking function can also be enabled afterwards by purchasing a new license key.

In order to use the networking function, a third program should be installed on the PC where the archive is stored: the DATA SERVER. The executable file is named "SicesRemoteData.exe".

In the "automatic execution" folder of Windows, a link to this file will be created, named "SicesRemoteData". This way, the program is automatically executed upon machine start-up. Moreover, the operator is not allowed to close it. It can be closed only by turning off Windows. The DATA SERVER communicates with all the SUPERVISORS on-line, thus allowing for data centralization and avoiding simultaneous modifications to the files.

The centralized information are:

- Plant configuration
- Call history log
- History logs acquired from the memories of boards

However, the history logs produced by the SUPERVISORS when connected to the boards are not shared.

10.1 Configuring the Networking Function

To configure the networking function you need to:

- Install the DATA SERVER on a PC and check that it is correctly executed (NB: it is also possible to install the SUPERVISOR and the COMMUNICATION SERVER on the same machine).
- Share the installation folder (typically "C:\programs\SicesSupervisor") to allow read-access to all the SUPERVISORS.
- Install the SUPERVISOR and COMMUNICATION SERVER on the PCs you wish to connect to the network.
- It is necessary to execute the network configuration procedure on all the PCs of the network.

10.1.1 Network Configuration Procedure

To execute this procedure go to "File → Network configuration". The procedure consists of four steps:

- **Step 1:** the first step consist in specifying whether to activate the networking or not. Tick the item "Enable data and configuration sharing". It is necessary to tick this option to pass onto the next steps.
- **Step 2:** this second step allows specifying how SicesSupervisor should communicate with the DATA SERVER. Firstly, indicate the PC where it is installed by entering the machine name or the IP address (it is also possible to browse the network and select the icon of the relevant machine). Then, set the TCP port used for network communication (always leave to 1001).
- **Step 3:** this step allows configuring the maximum time acceptable for the messages on the Ethernet network (it can be configured to allow the system to work also on modem networks).
- **Step 4:** this step allows configuring the automatic operations of SicesSupervisor on the network. NB: such operations are automatic and periodical, so they should be limited if the network is slow or if there are many SUPERVISORS working on it. Start by configuring the periodical interval at which SicesSupervisor should check for the presence of the DATA SERVER. By setting it to zero, this check is carried out only when performing an operation involving the server. If the network is sufficiently fast (10-100 Mbit/s) you should leave this option enabled so that SicesSupervisor may warn the operator in time in case the SERVER is not available. If the interval set is not 0, it is possible to enable the automatic update of the resource manager from the DATA SERVER database. This allows automatically displaying on all PCs any changes or additions to the plants made on one of the PCs. It is suggested to disable this function only if the network performance is extremely slow, not to overload it. If disabled, when SicesSupervisor contacts the DATA SERVER and detects that the resource manager should be updated, a warning window is displayed. This window is always in foreground and provides a button to start the update.

At the end of the procedure, the status bar of SicesSupervisor should display the network operation status.

10.1.2 Selecting the Plants to Be Managed

When using the network function, it may be useful to configure each PC to specify which plants it should be allowed to manage. To do this, follow the path "File → Select the plants to be managed". It is not possible to select a list of plants. You must select only a resource which could be a plant or a container. If you select a plant, the PC will be allowed to manage only the specified plant; if you select a container the PC will be allowed to manage all the plants in that container or in the relevant sub-containers. Obviously, by selecting the root container "\$\$" the PC will be allowed to manage the whole hierarchy.

As a consequence, the plants in the containers should be configured by keeping in mind not only the personal criteria (geographical location, type, etc.) but also the visibility they should have on the network. Example: if four plants are created (A, B, C, D) and PC ONE is supposed to manage only A and B while PC TWO only C and D, the plants A and B cannot be stored in the same container as plants C and D.

10.2 Interlocks on Resources

Sharing data and configurations means, in particular, managing simultaneous accesses to the resources shared. To avoid simultaneous accesses that may result in data inconsistencies, three types of interlocks have been provided for the resources described in section 3.1:

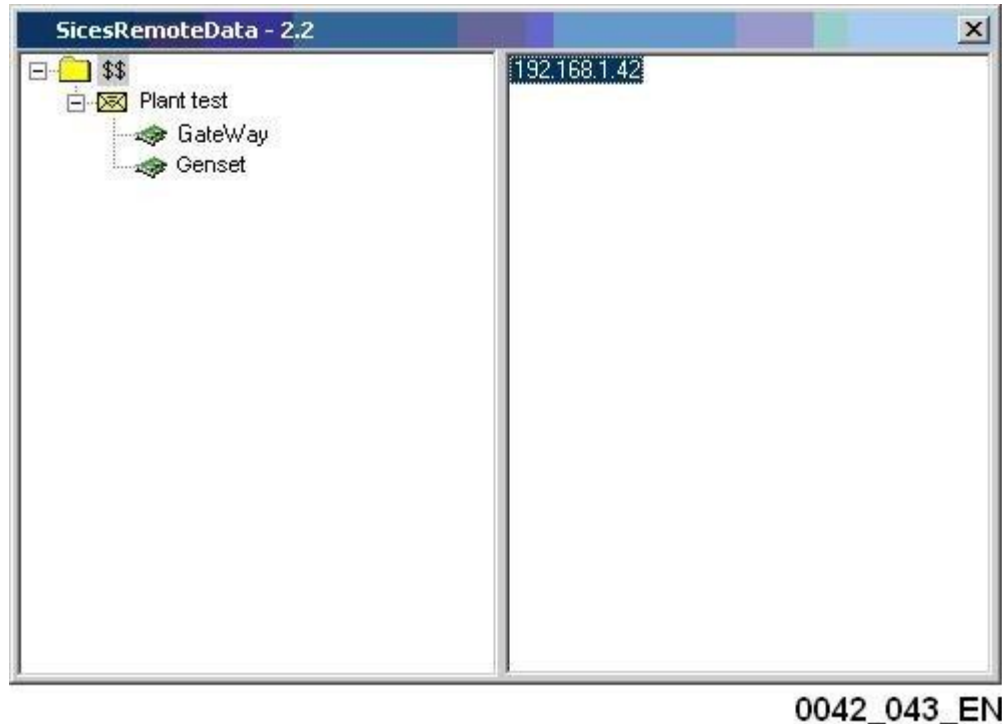
- **Read interlock:** it allows all the PCs on the network to use the resource (board, plant or container) but any changes are not allowed. A read-interlocked resource is displayed in blue in the main window of SicesSupervisor.
- **Write interlock:** it allows only the PC that set the interlock to modify and use the resource. A write-interlocked resource is displayed in red in the main window of SicesSupervisor.
- **Interlock for multiple operations.** Some operations (such as the board history log acquisition) have a specific temporal sequence that should not be interrupted. When using the network function via Ethernet, two or more PCs may try to execute the same operation at the same time, thus invalidating each other. This type of interlock prevents several operations to be carried out at the same time (only the one who set the interlock is allowed to execute the operation). An interlocked resource for multiple operations is displayed in green in the main window of SicesSupervisor.

10.3 DATA SERVER Availability

Networking depends on the availability of the access to the DATA SERVER via the Ethernet network. If the machine where the SERVER is installed is turned off or not accessible, the other PCs may not be able to work. To avoid this inconvenience, a special function to save a copy of the database is provided at the path "File → Backup Server Databases". This allows copying the configuration database on every PC, thus avoiding down-times until the Ethernet network is available again. This operation may overload slow networks and therefore is not executed automatically. When working on a local copy, SicesSupervisor shows a warning to the operator every time he/she makes an attempt to modify the configuration, since any changes will be lost as soon as the network is available again. With regard to the board history logs and the call history log, they will be correctly copied on the SERVER as soon as the network is available again. It is therefore possible to carry out any operations even if the DATA SERVER is not available, except for changes to the configuration.

10.4 DATA SERVER Window

Upon launch, the DATA SERVER (SicesRemoteData) does not show any window but only an icon in the tray bar of Windows (next to the clock). By clicking on the icon the following window is displayed. The DATA SERVER cannot be terminated by simply closing the window (the only way to close it is to use the "CTRL + ALT + CANC" combination or to close Windows).



The window shows the plant hierarchy in the right part, just as it is displayed in the resource manager of the SUPERVISOR. The right part also shows the IP addresses of the machines where the SUPERVISORS connected to the DATA SERVER are operating.

By right-clicking on this window the "Update" message is displayed. By clicking on this message the program carries out an immediate refresh of the PCs currently connected.

11. Minimum Requirements

The PC where the supervision application is to be installed requires at least:

- 32 MB of RAM (128 recommended).
- 30 MB of free space on the HDD.
- CD-ROM drive.
- Monitor with 800x600 resolution or higher (256 colours minimum).
- One or more communication devices (network board, serial ports, modem, etc.).

The application is compatible with the following operating systems:

- Windows 98.
- Windows 2000 with Service Pack 2 or later release.
- Windows NT 4/ WorkStation with Service Pack 3 or later release, Internet Explorer 5.0 or later release.

- Windows XP.

The application is **not** compatible with the following operating systems:

- Windows 3.1.
- Windows 95.
- Windows ME.
- Any non-Windows operating systems (Linux etc.).
-

12. Installation

The application is available on CD-ROM. All the files necessary for installation are provided in the CD. The application exploits the "Windows Installer" technology and is therefore well-known if you have already installed commercial programs on your PC.

A paper licence agreement is provided together with the CD: before opening the CD package, carefully read the agreement. The act of opening the package is considered by S.I.C.E.S. s.r.l. as a tacit acceptance of all the conditions stated in the agreement. Moreover, S.I.C.E.S. s.r.l. allows making a copy of the CD only for backup purposes: it is not possible to install the program on more than one machine without written consent (a license is requested for each installation).

Before installing, it is suggested to close all open programs, in order to prevent those programs from using a shared file to be updated by the installation program (in this case updating would be impossible and the installation procedure would be aborted).

In case a previous version of the supervisor is already installed on the PC, proceed as follows (**Warning: it is compulsory** to follow this procedure, or else the application may not work):

1. First of all, carry out a backup of the machine and database data (network or local).
2. Uninstall the existing version. (see following section '12.1 Uninstalling').
3. Install the new software version.

N.B.: In case the previous version is 2.XX all the data and configurations will be kept, while for versions 1.XX all the data and configurations will be lost since the storing formats for versions 1.xx and 2.xx are incompatible.

Installation :

If the PC where you are carrying out the installation is equipped with the "AutoPlay" utility, you just need to load the CD: the installation procedure will be launched automatically. If this utility is not present, execute the "Setup.exe" file available on the CD (click on the "Start" menu > "Run" in Windows). Enter "D:\SETUP.EXE" and then click on "OK". In case your CD-ROM drive is not named "D:" enter the correct letter associated with your driver.

All the messages and descriptions of the installation program are in English. The installation follows a step procedure. The license agreement is shown again, and then it is requested to specify a folder for installation (it is suggested to maintain the predefined folder). You can quit the installation procedure any time by clicking on "Cancel". At the end, the program will be correctly installed on the hard disk of the machine and the "Start" menu will feature a new folder named "Sices", containing a sub-folder named "SicesSupervisor" where all the links to run the application will be stored.

Two kinds of installation are available:

- Typical: it installs the SUPERVISOR but not the DATA SERVER.

- Custom: it allows selecting whether to install the SUPERVISOR or the DATA SERVER or both.

In some cases, the installation procedure may fail. This may occur on Windows 2000 and XP. In these operating systems, Microsoft has implemented a protection function for the file system which, as a consequence, can be updated only by means of Microsoft's "Service Packs". Therefore, if the application needs a more recent version of a file system, it will not be able to update it. The installation program will therefore prompt a message requesting to update to the most recent "Service Pack". The "Service Pack" can be downloaded for free from Microsoft's website. Starting from Windows 2000, the "Windows Update" function, in the Start menu, allows for the automatic installation of the "Service Pack". The application does not run on Windows ME, since no "Service Pack" has been provided by Microsoft for it, although it implements the file system protection function and therefore it cannot be updated.

The installation procedure may fail for other reasons, for example a lack of space on the hard disk of your PC. Carefully read the error messages prompted by the installation program.

The application is protected by a license key. This key is not requested during installation but when launching the program for the first time (see 3.6).

The system may request to restart your PC at the end of the installation.

12.1 Uninstalling

To uninstall the application, go to the control panel of Windows: "**Start**" > "**Settings**" > "**Control Panel**". Then, open the "**Application Installation**" function. Windows will show a list of all the applications installed that can be correctly uninstalled. Click on "**SicesSupervisor**" in the list and then click on "**Add/Remove**".

13. Registered Trademarks

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